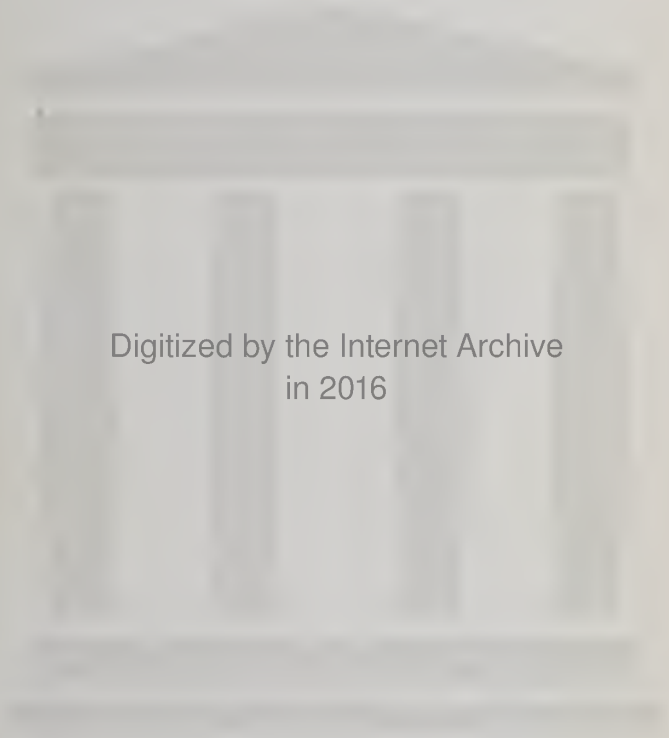

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1834.

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease."

SIR WM. JONES.

Calcutta:

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1834.

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THE ASIATIC SOCIETY.

No. 36.—*December*, 1834.

I.—*Some Account of the Territory and Inhabitants of Naning, in the Malayan Peninsula. By Lieut.* J. T. Newbold, *23rd Regiment, Madras Native Infantry.*

Topography.—Naning is an inland territory; its mean length north and south, about forty miles, by an average of ten in breadth, giving 400 square miles. The boundary to the northward was never clearly defined till the 9th of January, 1833, when Mr. Westerhout, the Superintendent of Naning, came up to Sunjie Seepoot, a village near the frontier, to meet the Rumbowe chiefs, with a view of determining the respective boundaries of the two territories.

An agreement was here drawn up, and signed by the Raja Muda, the Panghulu of Rumbowe, Maharaja Lilah, and the eight Sukus, and by Mr. Westerhout and two witnesses on the part of Government.

The boundary line agreed on, commences at Qualla Sunjie Gernee, thence to Bukit Bertram, thence to Bukit Jelatang to Bukit Puttoos, thence to Jeerat Gunjie, Lubo Talan, Duson Feringie, Duson Kapar, and Ooloo Songa, to Bukit Puttoos*. By this arrangement a spot fertile in tin, and a small access of territory, have been gained to Government.

* The boundaries of Naning with Johole and Malacca have been fixed, since the writing of this memoir—with the former, the line extends from Bukit Puttoos to Bukit Battang Malacca, and terminates at Mount Ophir. The Malacca line commences at Mount Ophir, and thence taking a south-westerly direction, passes through Rambotan Gading, Battle Bakawat, Bukit Lansat, Bukit Badorie, Bukit Panchoor, Pankalan Sompit, Qualla Sungiepattye, Campong Kodia Pacho, Pondo Sassam, Pondo Panjang, Pondo Battu, Bukit Kaya Arang, Bukit Pembagiun, Ramoun Chino Kechil, and Tebbing Tingih. From Tebbing Tingih to Qualla Londoo, the Rumbowe river is the boundary between Naning and Rumbowe to Qualla Surgie Gernee.

This line with part of Johole and Mount Ophir forms the eastern and northern boundary; to the southward, Naning is bounded by the Malacca and Assahan territory; on the west by Malacca, and the left branch of the Lingie or Rumbowe river.

The face of the country presents an undulating extent, interspersed with high knolls thickly clothed with jungles; the hollows, or rather flats between these undulations, where the water lodges in the rainy season, average 70 or 80 yards in width, and either form a swamp or paddy-ground, according to the industry or otherwise of the natives in the vicinity.

The soil on the high grounds is red and gravelly generally; on the flats, soft and whitish. Pipe-clay is found in some parts, as also a rich black soil.

Naning has only three streams, scarcely to be called rivers—Sungie Rumbowe, Sungie Malacca, and Sungie Londoo; of these, the Rumbowe stream is much the largest. It enters Naning from Rumbowe near Qualla Maraboo, whence it makes its exit into the Malacca territory, a little below the place where it receives the waters of Sungie Londoo. It is here nearly 16 yards broad, and passable for troops in dry weather. In the rains it is not fordable.

Trees thrown across here and there constitute the only bridges: boats come up, but their supply is precarious.

This and the Lingie river unite below Sempong, a tongue of land belonging to Rumbowe, which is formed by the division of the two streams, about six miles below the north-western extremity of Naning, and nearly midway between it and the sea, where it empties itself, dividing the Malacca and Salengore territories about 24 miles to the northward of Malacca. Up to Sempong its mean breadth is 180 fathoms: soundings at the mouth (high-water and spring-tides) seven and eight fathoms. The tide barely reaches to the Naning territory.

Sungie Londoo is a small stream taking its rise at Bukit Kayu Arang, or the Ebony Hills in the Malacca territory. It enters Naning near Cahow, taking an almost northerly course, and emptying itself into the Rumbowe river below Si Maraboo.

Sungie Malacca is formed of two branches, taking their rise, the one in the hills of Rumbowe, the other near Battang Malacca, in Naning; they unite near Sabang, taking a westerly direction, and quitting Naning near Sungiepattye, fall into the sea at Malacca, having an embouchure of about 16 yards wide. In the wet season it is navigable for provision and baggage boats to Ching in Malacca, and thence by Malayan canoes (sampans) to Sabang in Naning.

Throughout Naning it is fordable in dry weather, but not in the rains; it is crossed at short distances by the usual Malay rude foot bridges.

Its bed is generally sand and gravel; the banks grassy and sandy; in some parts steep. Besides these streams, there are many small rivulets not worthy of notice.

The native roads are merely foot-paths, cut and cleared constantly by the Malays as they pass along with their Parangs, which a Malay is seldom or never without.

There are vestiges of a road here cut by Colonel FARQUHAR, from Malacca to Sabang in Naning, which it enters near Malacca Sinda; but from neglect it is little better than the native foot-paths.

The Malay roads run over the bunds of the paddy-fields, which frequently break down, leaving a deep puddle, over which they throw a bamboo or two as a bridge; their streams and rivulets boast of nothing better than a couple of trees felled carelessly across their course, with sometimes a slight bamboo as a hand-rail.

These paths if little travelled on by the Malays are liable to serious obstruction, particularly in a military point of view, from the numerous forest trees blown down by the wind, or falling through the decay of age.

I have seen in a remote part of this country, the path as effectually barricaded by this accidental obstruction, as if a body of Malays had been at work to cut off our communications.

A military road of communication between Taboo (the wretched capital of ABDUL SYED, situated nearly on the frontier of Naning), was opened during the operations in 1832, following in parts the old Malay foot-path. It enters Naning at Sungiepattye, passes through Alor Gajah (now FORT SISMORE, our chief military post), over the shoulder of the hill of Bukit sa Booseh to Taboo, where it terminates about three and a half miles from "Kubur Feringie," (the ancient tomb of a Portuguese in the jungle,) on the Rumbowe frontier, to which territory a path through a dense forest leads.

The Taboo road was constructed on excellent principles, for the service for which it was intended; a thick and lofty forest has been cleared to the extent of from 70 to 100 paces on either side, precluding the possibility of trees falling or being felled across. The low underwood in the intermediate space was burnt so as to afford the lurking Malay no shelter. Brushwood and branches of trees, secured on either side, by strong piles, and layers of gravel thrown over the whole, enable the guns and provision carts to pass with ease the numerous Sawahs and marshes.

From the Naning road, at its entrance into the Naning territory at Sungiepattye, branches another nearly due west, leading to Sungie Baru, a cultivated district, distant about nine miles. This has been constructed since the cessation of hostilities. Another road to Sabang, (one of the most populous places in Naning, and a military post, about four miles from Alor Gajah,) branches off in an easterly direction. From Sabang there is a bullock road to Taboong, the most easterly of the Naning outposts, eight miles distant from Sabang; also a bandy road to Taboo, which joins the road from Alor Gajah, shortly after entering the Taboo lines. From Sabang are also roads to the outpost of Qualla Eena and Pellowe, three or four miles distance from thence.

Water is plentiful, and may easily be got, two or three feet below the surface, on the slope of the rising grounds. It is often of an acidulous mineral taste, but is not accounted unhealthy by Europeans.

There is a hot sulphureous mineral spring near Sabang, the water of which is esteemed by the Malays as very beneficial in cutaneous diseases. I have rarely passed without seeing some diseased native laving his contaminated person in the steaming liquid. There is also a hot-spring in the jungle near Taboo: the natives say that the temperature of this is much greater than that of the Sabang spring. I have not been able to discover that a volcano has ever existed in Naning, nor are there any volcanic remains visible.

A small portion of gold is, I understand, to be found in Naning, and tin in considerable quantities; but it wants a more industrious and energetic population to turn these advantages to account. Mr. Westerhout, Superintendent of Naning, has established a tin mine at Londie, about two and a quarter miles from Taboo; of the produce of which and the ore I possess very favorable specimens. The charcoal used by the Malays for roasting and smelting the ore is that of the Compas and Kamounin wood. The following is a translation of the simple Malay mining process, given me by a Malay miner:—"Excavate the ground to the depth of a man; if there be ore, you will find it like small dark stones; then make a channel to drain off the water. This done, construct a furnace, like the one used in burning lime, with a funnel beneath, to allow the fused metal to escape: heap it with the ore and Compas or Kamounin charcoal, set fire to and blow it, and the metal is produced." Straits tin is now selling at $13\frac{1}{2}$ dollars to $14\frac{3}{4}$, and Banca, from 15 to $15\frac{1}{2}$, per picul. The natives' mines are very superficial, seldom more than from six to twelve feet deep, and as many in length and width. The process will be more fully described hereafter.

Produce and Trade.—The chief produce of Nauing is rice, timber, and fruits; of the former, the produce averages 70 gantams to one

sown. There is one crop a year. The inhabitants carry on a trade with Malacca, in timber for house-building, and in fruit; the rice is generally used in home consumption.

Gambier, ratans, 21 varieties of Kaladi, jaggery, dammer, together with a small quantity of pepper, pân and betel, marabow, compas, ebony, and kamounin wood, with wood-oil, and a little inferior coffee are likewise found; pepper and gambier were much more cultivated than at present, the diminution is to be ascribed to the present low prices these two articles bear in the market.

Pepper to pay well ought to fetch seven dollars per picul, the price now varies between five and six. Gambier sells at 3 and $3\frac{1}{2}$ dollars; it has been stated that Naning produces annually three hundred piculs of tin, sixteen thousand gantams of paddy, and a quantity of coir-ropes.

Sago, Nibang, Ranjow, Areca, and Jack trees are plentiful.

I possess lists of ten different varieties of cocoanut trees, of which the "Klapa Logie," a sweet cocoanut, is most esteemed.

Also thirty-nine varieties of plantain, of which the "Pisang Berangan" and "Pisang Raja" are the best; the odoriferous Dorian is accounted by Malays the first fruit in the world. There are two or three varieties of it in Naning, of which the "Dorian Tambago," and the "Kapatah Gajah," or the "Elephant's Head," are held the greatest delicacies. The Mangis or Mangosteen grows in Naning, an excellent fruit, of which I do not hear that there is more than one variety; Pine-apple, Rambotan, (two varieties) the Duku, the Fampony, the Sangoeh, (three varieties,) the Dalimah, and about fifty others, of which I have lists, as well as most of the jungle trees, with the native mode of cultivation, which for the sake of brevity are omitted.

There are forty-five species of trees in the jungle, of which the fruit is edible, and of which the Naningites availed themselves during the late disturbances. There are fourteen varieties of oranges and lemons, and sixteen varieties of yam, and twenty three of culinary vegetables.

Naning produces most of the animals to be met with on the Malay Peninsula; amongst the principal of which are the elephant, rhinoceros, and tapir, (rare) a variety of tigers, tiger cats, leopards, monkeys, bears, aligators, and guianas, and an endless variety of birds—the Argus pheasant, the peacock pheasant, rhinoceros-hornbill, humming birds, and a large vampyre bat called the Kaluwang. Snipes are common; but the hare and common partridge are not to be met with. There are a great variety of snakes, and one or two of deer; two varieties exceedingly minute, termed by the Malays the "Plandok" and Napu, the flesh of which is dried and eaten.

The Malays in Naning do not cultivate more rice than is absolutely necessary for their private wants, and the portion annually given up to the Panghulu; this is generally cut in February and March. The principal grain districts are Sabang and Malikie. The Panghulu depended on these places in a good measure for his supplies. Fire-arms and gun-powder are scarce.

Carriage is got with difficulty and expense in Naning. Coolies are the best means of transporting baggage.

The Malays are despicable as an enemy in open ground, or at close quarters, (except the rare Amok,) seldom or never trusting their persons from the protection of a breast-work or trees; when they retreat, they plant Rangows (a sort of wooden caltrop) in their rear. During a war which lasted two months, behind breast-works, between the chief of Rumbowe and a confederacy of minor chiefs against him, after a large expenditure of powder and a disastrous list of bursten Lilahs, the bills of mortality actually amounted to two casualties. In short, their plan is one of incessantly harassing the line of communication, stockading and retreating: the best, in fact, they could adopt in a country covered with forest, and where every tree is a strong-hold, and every road a defile.

Taboo is the only decidedly unhealthy post to Europeans; of the officers who remained there, any length of time, one alone escaped fever.

It is situated, not low, but surrounded by lofty hills, covered with jungle, which, perhaps by impeding the free circulation of air, may contribute to its character for unhealthiness; which it also bears from the natives themselves.

The climate of the interior is not favorable to the long occupation of the country by Indian troops; at all events they would require frequent reliefs. Fever and an obstinate ulcer attacking the legs, are their principal enemies; a slight scratch without attention being difficult to heal.

The ulcer attacks the Malays also; they call it توكق *tokah*; they also have a species of leprosy called كست *kusta*, and a disease, like cholera, called انگين طاعون *angin táawan*, or the "Wind of Pestilence:" both of these last are deemed incurable in Naning, and the unfortunate sufferer is generally deserted by his friends in his greatest need, or driven into the jungle to perish, as an outcast. Katumbohan كتومبوهن or small-pox, is prevalent. I have not heard that inoculation or vaccination, is known to the natives; at all events, it is not practised; they use refrigerating medicines.

Population and Revenue.—The census of 1829, gives the population of Naning at 3,458 souls, of whom 1,800 are capable of bearing arms, and 911 houses. The revenue is derived from its produce, and has been estimated before the war at 3,000 dollars per annum;—this is probably above the average.

The Panghulu levied an annual tribute, formerly, from every house of five gantams of rice, and two fowls, and two cocoanuts*.

The principal villages are those of Sabang, Taboo, Chirara Pootih, Malikie, Battang, Malacca, Sungie Scepoot, and Brissoo Sabang, with the small campongs around, contain 148 houses; they present similar features to other Malay villages; the houses are situated near the edges of paddy fields, and invisible at a distance from the number of cocoanut and other fruit trees, by which, as well as a Paggah fence, they are usually surrounded; they are straggling, and one village runs into another, in a manner from which it is impossible for a mere observer to know where the one ends, and the other commences.

Taboo, the chief village and former place of residence of the ex-panghulu of Naning, lies about seven miles from our principal post, Alor Gajah, through an undulating country of jungly hills and uncultivated rice-grounds.

About two and a half miles from camp (Alor Gajah), crowning a small eminence, seventy yards to the left of the road, stood the stockade of Bukit Sabooseh, taken by Captain Poulton's detachment on the 25th May, 1832. This position commanded the Taboo road.

Below this hill, on the Taboo side, lies the village of Malikie, to which the expedition in 1831 penetrated. Farther on, about a mile, in a commanding position on the road, which gradually ascends to it, stood the stockade of Bukit Perling; thence towards Taboo, the descent of the hill is very steep, and as usual, terminates at the foot, in an uncultivated swampy rice-ground.

Perling was decidedly the strongest military position taken up by the enemy, and in some measure deserved the name "The Key of Taboo," bestowed on it, by the Panghulu.

From this up to the Taboo lines, the country on the left bears traces of a better cultivation, and a once numerous population.

The Taboo lines consist of a long mud wall, about eight feet high, and three or four thick, rivetted by stakes and branches of trees laid parallel to each other; this wall runs across the rice-grounds in the front, on the edges of the raised ground, on which grows a thick cocoanut tope, forming the rear, and containing a burial-ground, with several deserted houses; the lines are 840 feet long. There is a bastion-

* He also possessed the privileges of Hu Dendin, Pengutan, and Kapala Ayer.

like projection in the centre, the idea of which does the Malayan "Vauban" credit.

The left of the lines terminates in an epaulment, flanked by a steep hill, whilst the right terminates with the tope in a deep swampy rice-ground. The rice-ground in front is traversed by a small rivulet, and flanked by jungle, in which were three small stockades; and on the left by steep wooded hills, on the bottom of which, near the edge of the rice-ground, runs the Alor Gajah road.

In front of the left of the lines rises Bukit Penialangan, or execution hill, (so called from the ex-panghulu's selecting this as his "place de grêve,") commanding the lines from right to left: some distance in rear of the burial ground is a mosque, and the building where the تابوه Taboh or great drum, whence the place derives its name, was placed. The Taboh itself has been displaced, and now lies broken on the ground. The sacred baths of the ex-Panghulu, little sheds, are near this. Here the superstitious Malays were wont to seek a remedy for their maladies from the holy-water into which the sacred foot of the Panghulu had been dipped.

The house of the Panghulu was situated in the midst of an almost insulated cocoanut tope, and surrounded by a high stockade of bamboo, with an imperfect mud breast-work. It has been pulled down by order of Government, partly, I understand, to do away with any superstitious idea entertained by the natives of the Panghulu's future return to it, from the circumstance of its remaining standing.

The village of Taboo itself is a small collection of Malay houses, not amounting to 30, surrounded as usual by topes of fruit trees, and shut in by lofty hills, mostly covered with forest; it is considered unhealthy, as stated before; there are many idle superstitions connected with its environs.

The Rumbowe frontier at Kubur Feringie, through Chirara Pootih, the last Naning village, is distant hence about three and a half miles. Taboo is about twenty-two miles north by west of Malacca.

Religion.—The inhabitants of Naning are Muhammedans of the Sufi sect, and were converted in the thirteenth century in the time of Muhammed Shah, the first king of Malacca, prior to which time, it is supposed, that they were of the faith of Buddha; the distinction of Shiah or Rafzi, and Sunni, so common in India and Persia, are unknown to the generality of them, owing perhaps to their Arab teachers. Many being descendants of Arabs, their attention to the rite of Islam is more constant and regular than is to be met with among the Muhammedans of India, from whom also they differ considerably in their rites and ceremonies; though not in their belief in the great principles on which the

religion of Muhammed has its basis. Their criminal laws, though founded in the precepts of the Koran, are by no means so exclusively so as those by which the Indian followers of the prophet guide their conduct.

The حج *Haj* or pilgrimage to Mecca is here more common. The قربان *Kurban* and زكوة *Zakut*, sacrificing and giving religious alms, are more general. They circumcise both males and females; the women come out unveiled in public. They Moslems in India are generally Hanifites. The Naningites prefer the doctrines of Imám Sufí.

They devour locusts. Their rites of burial and marriage differ; they esteem the flesh of a buffalo as the greatest luxury; they have no "Urses." They hold three days of the week as lucky to commence any undertaking, viz. Monday, Thursday, and Friday.

In short, the Malay resembles more the Arab in the simple mode of his worship than the Mussalman of Hindustán, tainted and contaminated by the admixture of many Hindu observances and ceremonies.

They have no *Maulavis* nor *Ulimas* like the Mussalmans of India; they observe the five stated daily periods of prayer, as also the postures ركوع *Ruku*, and سجده *Sijdeh* اعتدال *Itedal*, and قيام *Kiam*.

There are four officiating priests attached to each mosque, besides the *Koli* or *Kazi* قاضي who presides over a number of mosques, viz. the إمام *Imam*, the خطيب *Khatíb*, the بلال * *Bilal* or *Muezzin*, and the *Panghulu Momkim* or *Mukim*.

The immediate religious care of the inhabitants of the *Mukim* (or parish) to which the mosque belongs devolves upon the *Imám*, *Khatíb* and *Bilal*.

There are two Kázis in Naning, "Selaho and Sulong Juman," (to both of these priests I am indebted for much of the information collected here on the religious usages obtaining in Naning;) the former resides at Campong Tengha, near Malikie, the latter at Malacca Pinda. The Kazi is guardian to all orphans, who have no near male relations; he is arbitrator in all knotty religious points, which the four inferior may not be able to decide; he confirms marriages. In the month of Ramzan, or the Malayan نواس *Puasa*, the Naningites present their Kazis with the فطره *Fitrat*, in the shape of small donations of rice, generally, one gantam from each individual. The Kazi receives at the death of any person one "*Suku*," and at sacrifices, the head of the victim.

The functions of the Imám are principally merged in the performance of the sacred rites of the Muhammedan religion, viz., those under

* Bilal was the name of the first Muezzin in the time of the prophet, and is used by the Malays instead of the term Muezzin.

the head of the إمامت Imamet, the مندي دن كفن *Mandi*, and *Kafan*, or washing and shrouding of the dead, the صلواة جنازه *Selat Jenazet*, or prayer pronounced over the corpse, previous to interment. The fee of the Imám is commonly one "*Suku*," and the clothes of the deceased. The *Imáms* of Malacca do not perform the duties of washing and shrouding the dead; the office is there executed by the *Bilal*, and in India by the Naib of the Kazi.

The *Khatíb*, as in India and Arabia, recites the خطبه *Khatbeh*, an oration or sermon, in praise of God, the prophet, and his vicegerents, on Friday, in the mosque, from the three steps of the ممبر *Mimbar*, a species of rostrum; and he performs the *Nikah* or marriage ceremony, for which he receives three Peraks (nearly equivalent to six annas), four cubits of white cloth, and a تكر *Tikar*, a sort of mat.

The duties of the *Bilal* are sacrificial; the calling to public prayer, the reciting of the تلقين *Talkeen*, the service for the dead, after the corpse has been lowered into the grave. He receives as his fee for this a *Tikar* and one *Perak*. When a goat or buffalo is sacrificed, he receives two fingers breadth of flesh from the victim's neck.

The *Panghulu Momkim* or *Mukim* is an inferior servant of the mosque, which it is his duty to keep clean, and in good order; to remove the bodies of the dead, to assist at burials, to go round the various Campongs and give notice of the performance of public prayer, and to report absentees to the Imám. He beats the تابوه *Taboh* or great drum of the mosque to assemble all devout Mussalmans to prayer.

The *Talkeen* is sometimes read by this functionary.

The Imám, Khatíbs, Bilals, and Panghulu Momkims are elected to their several offices, after an examination into their fitness and capabilities, by the Kazis and elders; besides the fees already mentioned, they each receive annually from every individual attending the mosque, a present of one gantam of paddy.

There are 16 mosques to the *Momkims* or *Mukims* (parishes) in Naning, viz. those of Taboo, Bukit Tootoo*, Pago, Taboong Pulu, Sonno, Brissoo, Sunjie, Seepoot Londoo, Ayer Parlas, Tanjong Reemo, Padang, Sabang, Kamooning, Pillowe, Malacca Pinda, Battang Malacca, and Malikie.

Each of these mosques are under the immediate controul of an *Imam* and a *Khatíb*; and under them *Bilal*, and *Panghulu Mukim*. The whole of the establishments are superintended by the *Kazis* or *Kalis*, of whom, as previously stated, there are two in Naning.

The mosques are repaired at the public expence, and are generally situated detached from any house or small insular knolls, in the midst

* This mosque has since been removed to Kalama.

of Sawahs. They are conical shaped buildings of wood, raised on wooden pillars, with ornaments of the same material, like the wings of birds at the eight corners of the two roofs, that cover the building like the "flies" of a tent, to which in shape they bear some resemblance; the inner part consists of one spacious room, kept extremely clean, with a wooden *Mimbar* or pulpit at one end.

The *Taboh* or drum is generally placed in a small building erected for the purpose close to the mosque. It is a long hollow cone of wood, over the wide aperture of which is stretched the strong hide of a buffalo. Before the time appointed for meeting at public prayers, it is beat by the *Panghulu Momkim*, to give the inhabitants of the surrounding Campongs notice.

There are no minarets to the mosques in Naning. The only one that I have seen in the peninsula is that of the Malayan mosque at Malacca: on the top of this is a gong, which is struck instead of the drum. The graves that are found near the mosques in Naning, are generally those of rich or religious men; poor men being generally buried at a distance.

At the mosques of Bukit Tootoo, near Alor Gajah, are the tombs of the late Raja Muda of Rumbowe, Rajah Assil, who was driven from his dominion by Rajah Ali, and that of Anja the predecessor of the ex-Panghulu of Naning.

A *Mukim* must consist of 44 houses, the *Khatbah* cannot be read in the mosque until the number be complete.

There are many tombs of men famed for piety interspersed throughout the country, in whose name the people of Naning make vows for the prosperous termination of any object, and go to their tombs to make oblations, &c. They call such tombs *Kramets* كرامت There is no particular day as in India, in which they conjugate to perform the عرس "Urs*" or pilgrimage.

The most sacred tombs or *Keramet* كرامت in Naning are those at Kala Kattee, Pace Dalum, and Bukit Paion, near Tabo; also those of Khateeb Batani at Londoo, of Dattu Dalon at Sabang, and those at Lubi Koppong and Kalama.

Those mentioned before at Bukit Tootoo of the expelled Rajah Muda of Rumbowe, and Anja, the predecessor of the ex-Panghulu of Naning, will, when hallowed by time, become "Kramet," which literally signifies "revered," "venerable," a "miracle;" but it is a term given generally by Malays to the burial places of the early Arabian zealots, who first preached the doctrines of Muhammed on the Malay peninsula.

* At Malacca there is an annual عرس Urs to the tomb of Wali Ismail, or Pulo Besar.

The *Bidán* بيدان or midwife always attends on the occasions of births; her hire is about a dollar for the forty days, during which it is customary for her to remain.

The new arrival, being washed, &c. the father puts his mouth to its ear, and pronounces the اذان *Azán*, or "*Allah Akbar.*" On the seventh day, the ceremony of *Bar Chukur* بر چوکر or shaving the head is performed, together with the فاتحه *Fateheh*, and مولود *Maulood*, a form of prayer used at births.

On the fortieth day, the woman performs the customary ablutions and prayers, and is pronounced clean.

The ceremony of براسه گیگی *Berasa Gígí*, or filing the teeth, takes place among women before the day fixed for the عنتربلنجا *Antar belanjá*, i. e. the day on which it is customary for the bridegroom to send the money for the marriage expences.

It is performed by a woman with a species of fine stone, brought generally from Achin, sometimes a fine steel file is substituted: the patient reclines on her back, during the operation; it lasts about an hour, and has been described to me, as producing a peculiarly harsh and unpleasant sensation, similar to that caused by the action of strong mineral acids. The teeth are generally filed down about quarter of their height. After the operation, the gums not unfrequently remain in a swollen and painful state for two or three days. The *Berasa Gígí* is performed on males at an uncertain period, but generally in early age, and is, as Mr. Marsden observes, generally the occasion of some family festival; as, also, is the ceremony of boring the females' ear.

The Malays imagine the process of filing down the teeth as indispensable to personal beauty; together with the subsequent operation of blackening them. This is done by the repeated application of a black liquid termed *Grang*, obtained by burning cocoanut-shells on iron plates.

Marriages are not contracted at so early an age as among the Moslems of India, but, as there, the parties chiefly interested have least to do in selecting their future partners for life.

The alliance is first agreed on by the friends of both parties, generally the matrons.

After this, a few friends of the bridegroom elect, wait upon the bride's father, and present him with a ring and a small donation of clothes; the marriage expences, which are paid by the man's friends, are then agreed on. The *Mahr* مهر or marriage portion of the wife is also paid by the man, and ought to be always a *tahil* of gold, or silver or some other less precious metal, according to his means*. It is usually fixed at the time of performing the نكاح *Nikah*, which is done by the

* It is however generally thirty Serapie—a sum nearly equivalent to 30 rupees.

Khatib, before two witnesses on each part, and a *Wakeel* or agent on part of the bride, who is not present, but remains at home. Thither the *Wakeel* and two witnesses go to ask her consent as a matter of form: the ceremony is then performed agreeably to the Muhammedan law.

The husband can then, if his wife have attained the age of puberty, carry her to his own house; if not, she remains in her father's house until the desirable event take place.

When the parties are wealthy, a buffalo is killed, and the friends of both parties feasted. The two inferior kinds of marriage common in Java, and self-prostitution, are rare in Naning, though instances have been known of husbands prostituting their own wives and children when pressed by debt or poverty.

Women about to be married cut off the hair (this ceremony is called "*Andam*") in front of the forehead. This is done, as well as the application of the "Inci" or "Henna" to the palms, and nails of the hands and feet, three days before the marriage ceremony.

Of the ceremonials after death the following may be noticed:

If the dying person has possession of his faculties, he recites or has recited to him the توحيد *Touhid*, a form of confession of the Unity of the Deity.

After death, the Imám performs منديي *Mandi* and كفن *Kafan*, or the washing and shrouding of the corpse; for this latter purpose, a long wrapper of cotton cloth, the deceased's *baju*, vest, and turban, and two *hiffafehs* are used; the grave is invariably dug the depth of a man's ear.

The Mussalmans of India make a distinction in digging it: for a man, the depth of the navel; for a woman, up to the breast.

The corpse is then placed on a bier formed of two planks, the exact length of the grave, to which it is carried, followed by the nearest relatives; females sometimes attend in Naning, but never at Malacca.

The صلوة جنازه *Selat Jenázeh* is then read by the Imám, standing: the corpse is lowered down into the grave, with the two planks that composed the bier.

It is not deposited on the direct bottom of the grave, but in a side receptacle about two feet high, the two planks are then forced down edgeways, so as to shut out firmly this receptacle from the rest of the cavity, which is then filled up by earth thrown through some green leaves and branches, in order that it may fall more lightly, till the upper edge of the plank is concealed, when earth is thrown in, and the grave filled up in the usual manner: a little water is then sprinkled, and the *Bilal* or *Panghulu Momkin* recites the تلقين *Talkin* on the grave, in a sitting posture, with his face turned toward the *Kibleh*, in the direction of which also the head of the corpse is inclined.

On the third, the seventh, the fourteenth, the fortieth, and last-

ly, on the hundredth day, *Fatiheh*, oblations of spices, aloe wood and flowers, are made to the manes of the dead.

Their burial places are raised banks of earth, with two small wooden pillars* or upright stones at each end of an oblong carved wooden frame, the largest denotes the head; they plant the *Sulasih* generally near burial-grounds, and sometimes the *Champáka* and *Camboja*.

They like other Muhammedans believe in the examination of the corpse by the Angels "*Munkir* and *Nakir*," who enter upon their inquisitorial functions, after the funeral attendants have retired seven paces from the grave, on their returns to their several homes.

Religious fasts, festivals.—Their religious observance of the first 10 days of the months Mohurrum, the 28th of Safr, the 12th of Rabi al awal, the first 12 days of Rabi al akhir, the 10th of Shában, the 30 days fast of Ramzán, and the first of Shavál; and lastly, the 10th to the 15th of Za-al Haj, resembles that of the Arabs more than the customs which obtain among the Muhammedans of India.

The sacrifice of the buffalo is, I believe, peculiar to Malayan Muhammedans. The buffalo selected for the *Kurban* must be without blemish or disease, its fore and hind leg bones must not be broken after death, nor the spine: neither are the horns to be used for common purposes, such as the handles of Kris, &c.

The animal, to be sacrificed, is thrown down in a convenient place near the mosque of the Mukim, by his hind and fore legs being bound together; his head is also secured and turned in the direction of the *Kibleh*, and water then poured over it; the Bilal advances with the sacrificial knife, (in Naning the knife, called *Gulo Rumbowe*, is generally used for this purpose,) and turning himself towards the *Kibleh*, recites the "*Bismilláhi helálan taieeban Allahu Akbar*," بسم الله حلالً طيبً الله اكبر four times successively, and then divides the wind-pipe and large blood-vessel of the neck of the animal. It is flayed after death, and divided into two equal parts. One-half is distributed among the inhabitants of the Mukim, of the other half two *chuppahs* (a little more than 2-lbs.) is allotted to the *Panghulu*, the head to the *Kali*, two *chuppahs* to the *Imám*, two to the *Khateeb*, two to the *Bilal* and *Panghulu Momkin* or *Mukim*.

The first-half is generally cooked and eaten on the spot.

On religious occasions, baffaloes are always sacrificed on one of these three days—Friday, Monday, or Thursday.

They are also sacrificed at weddings, births, circumcisions, &c. of wealthy people at the "*Chukur Anak*," or the ceremony of shaving the head of children, and finally on going to war.

* Those for females are generally flat and niched at the summit; they are called *Nissan*, probably from the Persian *Nishan* نشان.

On these occasions, the buffalo need not be without blemish, &c. and is killed according to the usual Muhammedan custom of the ذبح *Zabbah.*

In Arabia the camel is esteemed as the most acceptable sacrifice that can be offered; not only from the high repute, in which the flesh of this animal is held, among the inhabitants, but on account of its general usefulness. The Malays, in like manner, having no camels, select the baffalo, the flesh of which is esteemed, as before remarked, as the greatest delicacy imaginable; and every person who has travelled over the Sawahs of a Malayan country, can bear witness to the utility of the despicable looking buffalo.

Thermometrical Register kept in the open air at Alor Gajah, in the centre of the Naning district, by B. G. Maurice, *Asst. Surg. 23rd Regt. Mad. Lt. Inf.*

(Abridged from the original, by J. P.)

Note.—From August 1 to 4 and 13 to 22, and after the 16th of January, the observations were made at Malacca. All the rest were kept at Alor Gajah.

August, 1832.					*September*, 1832.				
Day of Month.	6 A.M.	2 P.M.	8 P.M.	Weather.	Day of Month.	6 A.M.	2 P.M.	8 P.M.	Weather.
1	79°	..	78°	thunder.	1	74	103	79	fine.
2	81	99°	84.5	close.	2	74.5	88.7	76	rainy.
3	80	92	80	threatening.	3	73.5	91	77	fine.
4	..	99.7	..	very close.	4	73	88	75.5	fog.
5	..	105.7	76	lightning.	5	74	86	80	rainy.
6	73	92	76	fine.	6	72	94.5	77	fine.
7	72	108	72.7	ditto.	7	75	91	77	ditto.
8	76	105	77	ditto.	8	74	100	80	ditto.
9	75.7	99	76	ditto.	9	76	99.5	78.7	ditto.
10	72	104.5	78	ditto.	10	73	88	78	light clouds.
11	73	87	76	storm.	11	71	95	79	shower.
12	72.5	95.7	..	cloudy.	12	73.5	96	76	heavy rain.
13	..	108	82	showers.	13	73.5	93	76	ditto.
14	82	104	80.7	fine.	14	74	97	77	fine.
15	81	104.7	82	ditto.	15	73	100.5	79	fog. rain.
16	81	91	82	lightning.	16	75	85	77	heavy rain.
17	77.5	92.7	80	heavy rain.	17	73	95.5	77	fine.
18	75.5	88	80	fine.	18	73	96	..	cloudy.
19	74	89	..	ditto.	19	74	95	78.5	showery.
20	76.5	89.5	..	ditto.	20	73	91	..	contd. rain.
21	76	84	..	heavy rain.	21	72.5	81	76	thk. fog.
22	74	90	..	fine.	22	72	92	77	cloudy.
23	..	95	..	ditto.	23	71	99	76	heavy shower.
24	72	90	78	heavy rain.	24	71.5	99	77	fog. rain.
25	74	91	76.5	cloudy.	25	74.7	95	78	fine.
26	74	86	75	showery.	26	73	91.7	75	showery.
27	70	96	73	foggy.	27	75	100	77.5	heavy rain.
28	70.5	102.5	76	fine.	28	77	90.7	77	shower.
29	71	89	75	thunder.	29	74	92	77	thk. fog.
30	72	..	76	fine.	30	73	89	..	showers.
31	74	104.5	76	rain.					

		October.		
1	74	91	77	contd. rain.
2	75	95.5	78	ditto.
3	..	95	77.7	fine.
4	73.5	89	79	ditto.
5	75	92	78.5	showery.
6	74.7	86	75	v. heavy rain.
7	71.7	91	76	ditto.
8	73	85	74	showery.
9	73	92	76	very hot.
10	74	97	76.5	fine.
11	73	92.5	77	fog. rain.
12	74	..	76.7	ditto.
13	73.5	93	78.5	fine.
14	74.5	91	76	showery.
15	73	85.5	75	show. rain.
16	73.7	107	..	rainy night.
17	74	90.7	78	fine rain.
18	73	..	..	ditto.
19	..	101	76.7	ditto.
20	72.5	104	77	ditto.
21	73.7	97.7	76.5	fine.
22	74.5	96.5	77.5	cloudy.
23	74.5	95.5	78	heavy rain.
24	75	89	78	close.
25	74	86	76	heavy rain.
26	73	90	..	ditto.
27	74	87	79	cloudy.
28	73	81	74	ditto rain.
29	74	76.5	73	contd. rain.
30	72.5	90.7	76	light ditto.
31	74	82	74	showers.
		November.		
1	70	83	75.5	fog. shower.
2	73.7	92.5	76.5	showers.
3	74	90	..	fog. rain.
4	73	93.5	76	showers.
5	73	81.5	75	cloudy.
6	74.5	100	79	ditto.
7	75	91	77.5	fog. shower.
8	72.5	83	77	heavy rain.
9	74	78.5	74.5	ditto.
10	74	82.5	76	fog. rain.
11	71.5	104.7	76	heavy rain.
12	73	79	74	ditto.
13	73	..	77.7	ditto.
14	74	86.7	75	ditto.
15	72.5	82	75	fine.
16	71.5	93	77.7	ditto.
17	73.7	109	77	ditto.
18	74.7	85	78.7	ditto.
19	73.5	116.7	77	showers.
20	72.7	87.7	77	fog. fine.
21	..	78.7	74	heavy rain.
22	74	109	77.5	ditto.
23	72.7	116	80	fine.
24	..	94.5	76	heavy rain.
25	76.7	86.7	76	ditto.
26	75	76.5	..	ditto.
27	72	..	76.5	ditto.
28	74	121.7	76.7	ditto.
29	..	86	75	ditto.
30	73	86.5	77,7	fog. fine.

		December.		
1	..	95.5	..	showers.
2	75	78	78	heavy rain.
3	75	96	80	fine.
4	75	65	77	ditto.
5	74	105	80.2	ditto.
6	74	99	77	fog. fine.
7	72	99	80	fine.
8	73.5	82	76	heavy rain.
9	75.5	86.5	75	ditto.
10	71	100	76	heavy showers.
11	74	88	76	cloudy.
12	..	92	77	showers.
13	74	108	..	ditto.
14	72	87	77	ditto.
15	73	101	77	squall.
16	..	103	77	heavy rain.
17	74.5	95	77.7	showers.
18	74	92	76	cloudy.
19	73	97	76.7	heavy rain.
20	74	92	76	light rain.
21	73	103	78	fine.
22	75	108.5	82	ditto.
23	75	98	78	light rain.
24	74	93	78	contd. rain.
25	73.5	91.7	..	ditto.
26	72	101.5	78.5	cloudy.
27	76.5	93.5	73.7	heavy rain.
28	72	115	80	fine.
29	76	101.5	77.5	ditto.
30	74	94.5	75	ditto.
31	..	94	76	ditto.
		January, 1833.		
1	..	..	74.5	heavy showers.
2	71	81.5	73	heavy rain.
3	71	83	72	ditto.
4	70	96	76.5	fine.
5	73	93.5	75	much rain.
6	..	94	77	fine.
7	70	92	76	ditto.
8	74	85	75	showery.
9	72	98.5	76	ditto.
10	71.5	103	77	ditto.
11	70	90	76	heavy rain.
12	73.5	100.5	76.5	ditto.
13	..	83	77	fine.
14	76	95.7	..	light shower.
15	72.5	98	77	fine.
16	71.5	94	78.5	ditto.
17	..	..	..	heavy shower.
18	..	..	..	fine rain.
19	..	93	77	ditto.
20	..	..	..	ditto.
21	74.5	..	..	ditto.
22	75	111	77	ditto.
23	75	93	77	showery.
24	75	112	77	ditto.
25	71	84	78	showers.
26	75	93	77	ditto.
27	75	83	75	heavy rain.
28	72	80.7	78	ditto.
29	75.5	91	76	ditto.
30	73	63.7	78	showers.
31	74	93	78	fine.

II.—*Notice of an Ancient Mahal or Palace near Jaunpúr, in which some Hindu Coins were lately dug up.* *By* V. Tregear, *Esq.*

The following particulars have been collected from different sources. Much is from the History of Jaunpur by Moulvee Khyr-ud-dín Muhammed, an anonymous translation of which was lent me by a friend. Part is from information afforded by the most intelligent natives I could meet with, and part is from personal observation.

Raja Jychand or Jychandra was ruler of the country from Buxar to Kanouj, and reigned about the Samvat year 1400. His favorite residence was near the city of Jamunpur. As a clue to the true period of his reign, it may be useful to mention, that Purmalik was in his time raja of Kalinjer and Rae Pithoura (also called Prithví Pat) was king of Hastinapur; also that the son of the former (named Bramha) was married to Belwa', daughter of the latter. Jychand's reign was undisturbed by the Mussalmans, but his son Lakhun was not so fortunate. Not only was his country taken from him, but he himself was sent to Delhi; where, some say, he was forcibly converted to Muhammedanism. In commemoration of their victory, the Mussalmans changed the name of his residence to Zafferábád.

Shah Feroz II. is by the Muhammedans considered as the founder of Jaunpur. The following is Khyr-ud-dín's account. In the year of the Hijri 772, Sultan Feroz was encamped near Zafferábád. Riding out for amusement, he was particularly pleased with a certain spot, on the banks of the Goomty, and determined to build a city upon it. A dream, in which his grandfather, Shah Jounan, appeared and requested the new city might be called after him, stimulated him to immediate exertion. A fort was erected on the site of a Hindu temple, which was destroyed for the double purpose of supplying materials, and making room for its successor. In this account I place little or no belief. I am inclined to think the Hindu statement much more correct. They say that *Jamunpúr* was a very ancient and large city, but had fallen into decay till the time of Jychandra, who ornamented it, and the adjacent country, with many large and beautiful temples. My reasons for placing more confidence in the latter than the former relation are first, the *fact* of its having been the residence of Jychandra; secondly, from the magnitude and number of the temples, which formerly existed; and thirdly, from the very circumstance of its having been chosen as the seat of the Soubeh.

That Jychandra did reside here, is hardly to be doubted. Tradition, handed down from father to son, still points out the spot where his mahal stood. The ruins of the fort built by him are still known

as Jychandra's kote, and two buildings (remaining of 12) are still shown as the places where he and his son Lakhun held their durbars. The Utala dewal, and one at Chachakpur, are mentioned in the History of Jaunpur as having been built by him in 1416 Samvat.

The following temples are said to have been destroyed by Feroz Shah and his successors :

The temple of Kerarbír, of whose materials and on whose site the fort was built ;

The Utala Dèwal ;

The Dèwal of Bijichand, (Vijaya chandra) a former Raja,

And the temple at Chachakpur.

Numerous other Hindu buildings were thrown down in Zafferábád as well as Jamunpur. The Kerarbír dèwal was destroyed without opposition ; but the attempt on the Utala dèwal was resisted, and the Emperor with his attendants forced to retreat. On the arrival of assistance from the camp, a severe conflict ensued, which ended in favor of the Hindús. The Emperor was forced not only to desist for the present, but to promise to refrain in future from such offensive acts. Under the government of Ibrahím Shah, the Moslem population seems to have outnumbered the Hindus. In that spirit of bigotry which invariably accompanies the Muhammedan power, the Hindus were greatly oppressed. They were forbidden to worship idols, or to sound the sankh, and at length, besides being taxed, were prohibited residing within a certain distance of the city. The splendid houses which they had built were given to the favorites of the court, and the attempts of Feroz Shah were renewed. The Utala dèwal was destroyed, and the present Utala Masjíd erected in its place. The other two temples, viz. that of Chachakpur, and that of Bijichand shared the same fate. In the erection of the mosques, the builders were ordered to turn inwards any figures which might be carved on the stones. As this injunction was strictly obeyed, I have no doubt many inscriptions have been by this means preserved.

The stones from the tank of Bijichand were used for the building of the mosque of Jumai-ushark, and those of the temple on the bank, for the mosque of *Khális Mukhlis*. The great extent of the present buildings, composed wholly of the remains of Hindu temples, are proofs of the magnitude of the latter.

Vanity or ignorance might lead the Mussalman historian to ascribe the foundation of so large and celebrated a city, to a prince of his own caste. That its conquerors improved it, or at least renovated it, I doubt not ; but the foundations were laid (most probably) ages before it fell into their hands.

It may be said, that *Jamunpur*, by which almost all the Hindus call it, and which every pandit affirms to be its real name, is merely a corruption of *Jaunpur*. I beg to say, that the latter is so of the former. The Mussalmans endeavoured to give the new buildings names as similar as possible to the old ones. Thus the mosque built on the site of the *Utala dèwal*, is called the *Utala Masjid*, from a custom of the former princes, who used to place in its court their travelling equipage and baggage. The *Bijí Mandal*, built by Rájá Bijichand, was called the *Bidí Manzil*, when converted to a Mussalman residence. The change, therefore, from *Jamunpur* to *Jaunpur* was not only easy and probable, but perfectly natural and consonant with the custom of its new possessors; more particularly as the date of its pretended foundation is shewn by that name. According to the *Abjad*, the powers of the letters forming *Shahar Jaunpur*, are 770.

Little doubt will, I hope, remain as to the city of Jamunpur having been very extensive previous to the Mussalman conquest. The fact of the populace having resisted successfully the Emperor Feroz and his troops is alone of great weight.

This allowed, it is not improbable that the prince of so large a country should have chosen the spot for his residence. No other Hindu names are preserved to whom could be attributed the building of the mahal, &c. The particulars gathered from my Hindu informants are, I think, more entitled to credit from their having been related to me, diverted of the fabulous and wonderful, with which ignorance and superstition delight to envelope the occurrences of past ages.

I have been unable to discover the former name of Zafferábád. One man informed me, he had once heard it, but could only recollect it sounded like Sompur or Samatpur.

The present town is situated along the western bank of the river Goomty, nearly four miles from Jaunpur. Jychandra's mahal is a mile and half to the eastward, on the concave bank, on an angle in the river. The bank is very steep and high, but the ruins reach in some slopes to the water's edge. There were very probably ghâts from the top. The whole building extended over about six bigas, which is now cultivated. The old fort is to the south of Zafferábád, and contains 11 bigas of land, but may stand on twice that quantity. It is now merely a mound of earth, about 50 feet in height, with the remains of the bastions still visible. All the stones and bricks have been removed to form the various buildings, by which it is bounded on two sides, as well as to supply the fort, bridge, and masjids.

The gold coins in my possession were found in the ruins by the cultivator of the "mahal." He brought them to the bazar for sale, but

the goldsmiths refused to purchase them, saying, they were useless, as on account of their bearing the figures of Ra'm and Sita, no one dared cut or work them up. To this circumstance they owe their preservation. They were taken from the villager by two zemindars, in whose possession they remained six years.

They are not exactly similar, though the difference is but slight. The symbols above the right-hand of the female figure are different. The male figures do not agree, but this may be owing to one being more rubbed than the other.

That which is most plain has at the back of his head a bow knot, with the ends long and waving. The armour on his legs is easily distinguished, as also the long robe. In both there appears to have been an inscription on both sides, and some letters within the bow. The standard, evidently some bird, is difficult to distinguish. The right hand appears to hold an arrow, the point of which is near the feet.

Any further information I may collect, I shall be proud and happy to communicate.

[The gold coins alluded to above are of the ordinary Kanouj type, of which several are depicted in the 17th volume of the Researches, and several more are to be found in Marsden's *Numismata Orientalia*. The letters are, however, more distinct than usual, and seem to make the words *Srí Vikrama*. Drawings of them will be given hereafter, but we have thought preferable to publish the particulars at once. We hope Mr. Tregear will favour us with a copy of the inscription he states to have found in an ancient character, on an image in a temple near Jaunpur, dated 515 years back. The form of the Nágarí characters at different eras, well established by dates, is a desideratum.—Ed.]

III.—*Price of Grain at Allygurh, near Delhi, from the year* 1804 *to* 1832 *inclusive. By* Edward Stirling, *Esq. C. S.*

In the course of my official duties, having occasion to ascertain the price of grain for some years subsequent to the conquest of this district, I thought it might be desirable to obtain the price of wheat and grain from the period of our first possession of the country to the end of last year. This I have effected, and the accompanying statement contains the result for each month during the last 28 years. In the last column on the right hand will be found stated the average of the year, and at the foot of the table, the average of each month for the whole period.

The prices of grain herein-mentioned have been abstracted chiefly from the Kotwalí records of the town of Coel, and an average for the whole month has been made from the daily prices of these two kinds of grain.

It seems necessary to state the weight of the seer specified. It consists of ninety sicca weight of the old Furukhabad rupee, weighing

about 173 grains, or equal to $86\frac{1}{2}$ sicca weight of present standard weight of 180 grains troy, so that one seer equals about two pounds and a quarter, troy weight.

In the present scarcity throughout the Upper Provinces, and southern parts of India, this table will not be, perhaps, uninteresting, to those who are desirous to make comparisons of the prices of grain in other parts of the country, and I hope may elicit information of a similar kind, and thereby embody a fund of knowledge that may be found hereafter useful to Government and individuals.

Abstract of a Table of the Prices of Wheat and Gram in the Market of Altyghur, from the year 1804 *to* 1832. *A. D. expressed in seers and chitacks, sold for one rupee.*

YEAR.	WHEAT.		GRAM.		YEAR.	WHEAT.		GRAM.	
	seers.	chts.	seers.	chts.		seers.	chts.	seers.	chts.
1804, ...	19	12	23	8	1819, ..	19	12	20	4
1805, ...	25	10	27	8	1820, ..	19	8	20	6
1806, ...	35	2	50	8	1821, ..	29	4	29	0
1807, ...	35	0	56	2	1822, ..	33	4	35	4
1808, ...	28	8	35	0	1823, ..	29	8	43	4
1809, ...	23	$0\frac{1}{2}$	29	12	1824, ..	34	4	44	6
1810, ...	33	0	38	12	1825, ..	29	8	33	6
1811, ...	51	8	67	12	1826, ..	20	6	19	8
1812, ...	35	8	49	8	1827, ..	33	2	30	12
1813, .. .	23	8	23	12	1828, ..	35	4	43	8
1814, ...	35	0	38	8	1829, ..	39	0	49	4
1815, ...	47	14	49	8	1830, ..	40	2	49	4
1816, ...	41	14	34	14	1831, ..	35	4	42	10
1817, ...	29	12	31	5	1832, ..	37	8	53	0
1818, ...	20	6	20	12	Avg. 29 yrs.	31	12	37	10

Average Variation of Price from month to month, the first nine months, for 28 *years; the last three, for* 29 *years.*

MONTHS.	WHEAT.		GRAM.		MONTHS.	WHEAT.		GRAM.	
	seers.	chts.	seers.	chts.		seers.	chts.	seers.	chts.
January, ...	30	11	36	2	July, ...	31	5	37	6
February, ..	31	6	37	4	August, ...	32	6	38	2
March,.....	36	12	41	0	September, ..	32	0	35	6
April, ...	34	10	42	12	October,.. ..	29	14	35	4
May, ...	32	14	39	8	November, ..	29	8	36	0
June, ...	32	0	33	0	December, ..	29	12	34	12

[The statement above alluded to, was so voluminous, containing the prices of wheat and grain for every month of each year, that it was impossible to set it up for the pages of the Journal; and it has, therefore, been neglected until now, when it occurred that the average prices of each year, and the average variation of price during the twelve months, might in themselves form an useful table for record.—Ed.]

IV.—*On the Nepalese Method of Refining Gold. By Dr.* A. Campbell, *Asst. Surgeon attached to the Residency of Nepal.*

Gold dust to the amount of two lakhs of rupees or more is annually imported from Thibet into Nepal. It is not reckoned pure, and is bought from the Bhoteahs by the dealers in Katmandu for about 15 rupees* per tola. The greater part of this gold is required for consumption in Nepal. A small portion of it for the Government mint, and the remainder for making female ornaments†, as well as chains and lace for the officers of the Gorkha army, who ornament their turbans with handsome and massive chains, embroider their regimental jackets most richly, and mount their swords and *kukries*‡ with the precious metal, to a degree highly detrimental to the purse, but eminently advantageous in making a display of splendour so grateful to this enthusiastically military people§. The process of refining is tedious, but not expensive, nor attended with much loss of the metal: it forms a separate occupation for a few individuals, but is for the most part performed by the purchasers themselves—and is, although rude, supposed to be very effectual, as gold can be purified through its means to an extent that raises its price from 15 to 24 rupees per sicca weight or tola.

The first step of the process is the melting of the dust, when it is cast into uniform plates about the thickness of writing-paper, and a little larger than playing-cards; in this state it is as impure as when in the original form, unless as is sometimes the case, insoluble and insulated particles of sand are mixed with it, which of course become separated during the melting. The plates, if cast too thick, are beat out to

* Nepal currency, about 13 Sa. Rs.

† Every Newar woman who can afford it wears a bar of plain gold, suspended by a ribbon from the neck; it is of a lozenge shape; and weighs generally from two to four tolas. Besides this, the most favorite ornament is a massive gold ear-ring, not suspended from the lobe, but worn in the upper part (helix) of each ear; it is shaped like two cones with a connecting bar. One of the cones unscrews, and when the bar is passed through the perforation in the ear, it is screwed on again. These ear-rings cost generally from 30 to 60 rupees.

‡ Short sword, peculiar to the hills, and worn constantly by every Parbattiah, great or small.

§ Every commissioned officer has his turban nearly covered with gold chains, tastefully arranged; added to this he wears the distinguishing mark of his regiment, which is a small plate of gold worn in the front of the "Pugree." Some corps wear a crescent to represent their "moon-born lineage," others carry the "Lion of England" above their brows. And every soldier of the Katmandu force wears the same of silver alone or gilded. The embroidery so thickly laid on the officers' coats comes mostly from Benares.

the requisite degree of thinness, and treated in the following manner: —The refiner having selected from some ancient ruined building the oldest bricks he can find, and pounding them into fine dust, proceeds to make up his masála or flux, which is of two kinds: in both the old brick dust predominates, and is considered indispensable to the efficacy of the process. One of the mixtures consists merely of brick-dust two parts, of common salt one part, intimately mixed up and pounded together: the other and best one is composed of brick-dust two parts, muriate of soda (salt) one part, borax $\frac{1}{8}$th part. The plates of gold being previously smeared over with mustard-seed oil, are piled upon one another to the number of 80 or more, between each pair a thin layer of the above cement being placed. Thus treated, the pile of plates is laid on a smooth and hard earthen floor, and covered with a heap of dry cow-dung *(gobar)*, which being set fire to, is allowed to burn slowly to ashes, care being taken that but a limited supply of air has access to the fire; to insure this necessary measure, the process is always carried on in a close room—by which means the fire is so slow and weak, so that fusion of the metal cannot possibly take place. The usual time occupied by the burning of the heap of cow-dung is about 20 minutes, after which, when cold, the plates are removed, and examined. The colour, softness, and shade of yellow left on the touchstone being the guides to their degree of purity.

The process is generally repeated three or four times only, when the ore operated on is tolerably pure, or where only inferior gold is wanted; but is repeated as often as 20 times, when the dust has been of the white* or worst kind, or where good dust is under operation, and the purest gold called *kundun* is required. The plates purified as above described are melted, and cast into small bars, in which form the metal is bought for making ornaments, &c. The dealers have acquired a wonderful degree of correctness in estimating the value of gold through the tests resorted to by them for this purpose. The touch-stone† is the chief one employed, but they rely mainly on the appearance and weight of the metal. They do not use scales, but by merely taking a bar in the hand, experience enables them to give from its weight, a wonderfully correct estimate of its value; and he who would expect from using a hydrostatic balance to outwit the native dealer, will find himself fairly and equally matched by the trained fingers and experienced ken of the Katmandu merchant.

* Most probably having a considerable portion of Tellurium (silver?) in combination with the gold.

† The sacred Saligram is the one most used here; they are very common, which may account for their being employed for profane purposes.

The refiners are in total ignorance of the rationale of this process, and I regret that I can only conjecture it, being unacquainted with the matters most commonly combined with the gold of Bhote, or forming its matrices.

Note to the above paper. By J. P.

The process described by Dr. Campbell is precisely that employed throughout India, and no where more frequently than in Calcutta. I took occasion myself to notice it in the Oriental Magazine for June 1827, for the purpose of pointing out a material error in many manuscript copies, as well as in the English translation, of Abul Fazl's description of the same operation. As the passage alluded is short, and the work containing it, now out of print, I venture to subjoin the passage:

"In Gladwin's translation of the Ayeen Akbery, there is an account of the native process for refining gold, in which it is mentioned, that a compositiou of 'equal parts of saltpetre and brick-dust' is spread between the plates of gold, which are then heated red hot, &c.

"As it is well known to chemists, that the ignition of such a mixture would only disengage nitric acid, the very acid which is actually used in the European method of refinage in the humid way, this passage is calculated to mislead even the scientific reader. The mixture really used by the native refiners is composed of equal parts of common salt (muriate of soda) and brick-dust, just in the same way as is practised in Europe, in what is termed the dry method of refinage. The rationale of the process is, that muriatic acid has the power of dissolving silver and copper at a red heat, and the muriates, being volatile, quit the surface of the gold plate as soon as they are formed, giving place to a fresh action from further acid, until the gold is rendered perfectly pure. The muriate of silver is not decomposed, unless some free alkali be present. Now, the nitric acid will quit all its bases at a red heat, and is itself incapable of acting upon silver at that temperature, although it will assist in oxydating copper and other metals: saltpetre is indeed frequently used in purifying silver. There is then evidently some mistake, and if so, is it attributable to the translation? or to the original work, which is so accurate and particular in most of its details? For the purpose of deciding this question, several old manuscript copies of the Ayeen Akbery were examined. In one the expression was simply *shoreh*, which agreed with the translation. In another it was *shoreh i khist khám*, the saltpetre *of* half-burnt bricks:—at last, in an older manuscript, the true original reading was discovered, which proved to be *nimak shoreh*, coarse *bitter common salt*, such as is given to cattle. The ignorance of copyists had imagined perhaps that the word *nimak* was redundant, mistaking *shoreh* for a substantive, as though it were written "salt of saltpetre," and *nimak* was therefore henceforward omitted. The ease with which the sense of passages in manuscripts may become varied is further evinced by the second example, where the original plain sentence of 'half of coarse salt, and half brick-dust,' has suffered two metamorphoses, and appears as merely 'the nitre of half-burned bricks!

"Perhaps in this place, a brief account of the whole process will not be devoid of interest.

"The gold to be refined, is beaten out into very thin leaves of 5¾ inches square, each weighing about 100 grains. From 100 to 200 of these leaves are piled over one another, being first dipped in a mixture of oil and water, and then smeared over with a composition of three parts of fine old brick-dust, and one part of common salt.

"A fire of cow-dung is made on the ground, upon which the pile of gold leaves is placed, and it is farther sprinkled with some more of the composition. Around the whole, a dome of cow-dung is raised, (see Pl. XXXV, fig. 5,) to which fire is applied, and the operator fans it with precaution, that the fire may not become too fierce, and melt the gold. The firing is repeated three times, after which the plates are separated and thoroughly washed. If the purification is to be carried further, another charge of the composition is interstratified with the leaves, and three more fires applied. Sometimes even the whole process is repeated three times. Bullion of 22 carats pure, is refined to 23 carats, by the first three heats. After six fires, it become 23 carats, 2¼ grains pure. The expence of the process is very trifling, and every part of the residue is saleable to the under refiners, who extract the silver and copper.

"The heat employed, measured by a pyrometric alloy cupel, was below the melting point of silver."

In publishing Dr. Campbell's account, I have with permission omitted his reasoning on the rationale of the Nepal process, to make way for a brief notice of some recent observations by the celebrated French chemist Boussingault*, whose experiments have led to a more accurate knowledge of the subject than was before to be met with even in the best works. This chemist had an opportunity of witnessing the art, now so completely exploded and obsolete among Europeans, in the mint of New Granada: "Certes c'était," he writes, "une circonstance des plus piquantes, que de me trouver au milieu de cette métallurgie du 16éme siècle, non-seulement d'observer ces fourneaux compliqués qui rappelaient la philosophie hermétique, mais encore de me rencontrer, scientifiquement parlant, avec des hommes de cette époque. On croyait voir des chimistes qui venaient de se réveiller après avoir dormi pendant trois siècles."

Instead of beating the gold into fine leaves, as in India, the practice at Santa Fé is to granulate it, and dispose the grains in porous earthen vessels, in alternate layers with a cement made of two parts of brick and one part of sea salt. The layers of cement are an inch thick; each pot holds 10 or 15 lbs. of gold; and the cementation continues from 24 to 36 hours at a cherry-red heat.

To decompose or reduce the silver, which is retained as a chloride in the brick-dust, the cement is triturated with mercury and one-tenth of fresh common salt, in a humid state. The muriate of mercury is washed off and an amalgam of silver and mercury left behind, which yields a very pure silver, (known in the Calcutta market as *plata pina.)*

* In the Annales de Chimie et de Physique, vol. liv. 1833, page 253.

In the process of cementation, it was evident that the silver was converted into a chloride by the action of *dry* clay and *dry* salt. Boussingault commenced his inquiries with precisely the same materials, operating on fine gold dust, containing 26 per cent. of silver, and substituting only well baked Cornwall crucibles for the fragile porous ware of the country :—he was surprised however to find that no action whatever now took place, although he maintained his fire for 72 hours! and to the exultation of the natives he was forced to allow the superiority of their old and despised methods.

To ascertain whether air was necessary to ensure success, one slip of silver, weighing 24.6 grs., was cemented in a well-closed crucible, covered with charcoal powder; while another of the same size was merely encased in cement, without a crucible, so as to favor the access of air. After seven hours, the former had lost only 0.3 gr., while the latter was reduced in weight to 9.5 grs. The presence of air was thus proved to be indispensable: it remained to examine in what way it acted. Salt by itself may be fuzed and sublimed in an open silver crucible, without acting upon it in any degree—the volatilization is materially accelerated by a current of hot air, but without any danger of affecting the metal.

Two slips of silver were again prepared, weighing 6.5 : one was cemented with a mixture of pure silex and salt; the other with pure alumina and salt. After four hours, under a muffle at a cherry-red heat, the latter had entirely disappeared; the cement was slightly agglutinated, crystalline, and no longer saline to the taste. The other slip still weighed 4 grs.; its surface was remarkably crystallized, and covered with a green glass, which adhered strongly. The cement was also completely vitrified, to which circumstance doubtless the bad success of the cementation was attributable.

It is known that pure silex has no action whatever on salt when both are dry, but the moment aqueous vapour is introduced, a powerful re-action commences, muriatic acid is disengaged, and silicate of soda remains. In the above experiments then water must have got to the cement even through the heated muffle of the furnace, and it occurred that the success of the Santa Fé cementation might be mainly attributable to the quantity of wet vapours necessarily formed in the combustion of a wood-fire.

To prove whether it was the water contained in the atmosphere, or that supplied by the fuel, that favored the process, Boussingault placed a slip of silver, coated with the cement, in a porcelain tube, heated red, through which he then passed a current of dry air :—the silver remained untouched.

The vapour of water being thus proved to be the principal agent, it seemed evident that the muriatic acid gas must be decomposed at a red heat by silver, although it is generally maintained that this metal exercises no action whatever on the acid even at high temperatures.

To ascertain this point, a slip of silver, rolled in a spiral, was placed in a porcelain tube passing through the furnace. A current of muriatic acid gas was admitted from one end, passing first through muriate of lime to dry it; at the other, a curved tube and chamber was fixed, to collect the gas that might be disengaged. At first some hydrogen was given off, but the disengagement soon ceased, and the muriatic acid gas continued to pass without decomposition. On examination, the surface of the silver was found coated with a varnish of chloride, which had prevented the further action of the acid gas. To remedy this evil, the slip was enveloped in alumina:—the action now went on better, though still slowly, and the chloride had penetrated but a little way into the coat of alumina. In the next experiment, salt was added to the clay, bringing it in fact to the composition of the cementation mixture; and now the decomposition proceeded with rapidity, the salt favoring in a singular manner the spreading of the chloride of silver through the porous substance of the alumina; probably owing to a combination between the two chlorides.

I have dwelt at some length on the above series of experiments, because they afford a beautiful application of scientific inquiry to a rude and practical process which has been handed down and imitated from generation to generation, without the least knowledge of the real action of the materials upon one another; and so apparently simple, that chemists had hitherto neglected to examine it. Yet in this rude result of the experience of ages, what a host of chemical operations are combined, and how necessary is every step of the process:—the brick-dust for instance answers a double object, first, to decompose the salt, and thus cause the disengagement of the acid gas;—and secondly, to absorb with the aid of the excess of the salt, remaining undecomposed, the chloride of silver as it is formed, and thus both to keep the surface of the gold free for fresh action, and to prevent the loss of the silver by evaporation, for the chloride is of itself very volatile.—The porous nature of the pounded brick allows the passage and access of the vapours, and thus gives it a preference over unburnt clay for the object in view. Again the wood fuel, or in this country, the cow-dung cake, giving abundance of aqueous fumes, is indispensable to the process, while the small intensity of its combustion affords a regulated heat so as not to endanger the melting of the gold, and its open texture promotes the circulation of the moisture, through the pile

within.—Nothing more effectual could have been contrived with the same degree of simplicity.

The humid process of refinage has however of late years been brought to such perfection, that it must finally drive the dry process off the field even in India, on account of its vastly superior economy. I have not space here to enter into any particulars of the new method of refining silver and gold by sulphuric acid, but I may remark that according to a recent publication on the subject by Gay Lussac, the refiners of Paris not only charge nothing for refining gold of low qualities, but actually pay a bonus to be allowed the job, returning to the proprietor all the silver contained in it, and paying themselves out of the copper alloy!

V.—*Notice of some Fossil Impressions occurring in the Transition Limestone of Kamaon. By Dr.* J. McClelland.

The three accompanying figures, Pl. XXXV. figs. 1, 2, 3, are a representation of appearances observed in a schistose rock, which is composed of argillaceous clay and hornblende. They are interesting for two reasons; first, because they assist to determine the period at which the rock was formed which, but for the presence of these appearances, and a few indistinct traces of orthocera, would be referred to the primitive era; and secondly, because they appear to constitute a new species of fossil remains. I have only found them in the valley of the Ponar river, a small stream which rises in the mountains between Lohughat and Almorah. The bed of this stream is about 1500 feet above the sea, and is chiefly composed of the rock in which these remains are found. Lofty mountains ascend to the height of some two or three thousand feet on each side of the river: some of these are composed of primitive and others of transition rocks, and the latter are superimposed on the rock in which these fossils occur. During a hasty survey of the bed of this river, I found the impressions only in the smooth surface of water-worn masses, and from the great size and globular shape of the latter, I was unable to detach any of the fossils with the hammer, and am therefore deprived of the pleasure I should otherwise have had of transmitting a few specimens to the Society. The accompanying drawing was, however, sketched on the spot, and conveys a pretty accurate idea of the appearance of these fossils as they exist in the rock. They never occur straight, being always bent and distorted, and a great number are usually aggregated together in the same stone. The rings are detached and equidistant from each other, and are always about fourteen or fifteen in number,

Fossil Impressions in Transition Slate.

fig. 1.

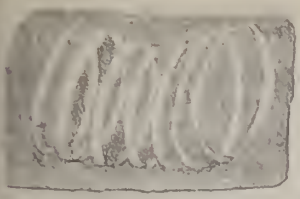


fig. 2.

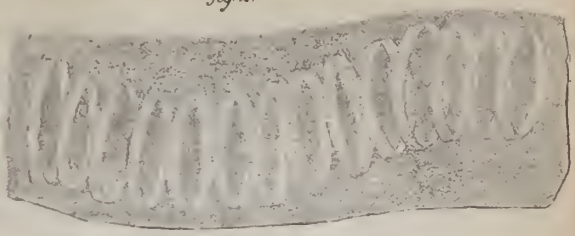
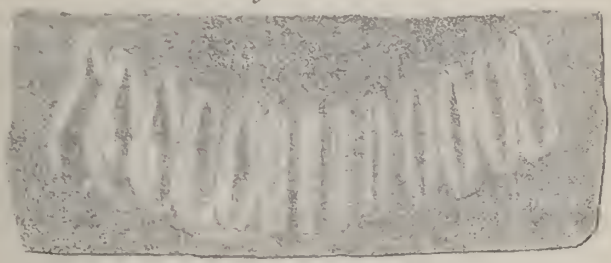


fig. 3.

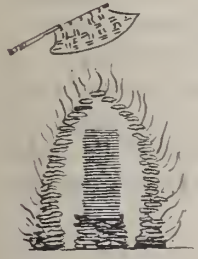


Fossil Impressions in Transition Limestone.

fig. 4.

Fossil (?) Crawfish from Ramree Island (see page 527)

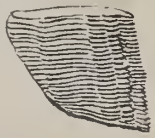
fig. 5.



Native mode of refining Gold.
(page 623)

Foot of a Land Tortoise, do.

Front



(full size) *Side*

except in such specimens as fig. 1 : these are probably only the remains of fragments, as they never consist of any fixed number of rings. We may refer these fossils perhaps to the Linnæan genus *Dentalium*, and the species may in that case be named *D. annulata*.

March, 1834.

The valley of the Ponar river, where the peculiar appearances represented in my notice of March are found, is so hot and unhealthy, that it is quite deserted at this season, and the path leading to it is so difficult that for eight or ten miles it must be travelled on foot; a performance which an European could not accomplish with safety except in the cold weather.

This will account for my not being able to send you at present the specimens you require; and whether I be permitted to remain in this neighbourhood long enough to be enabled to procure the specimens is somewhat uncertain.

These considerations induced me to make an effort to procure some of the fossils without delay; and on receipt of yours of the 27th ultimo, I despatched a few natives to the spot, provided with such implements as I could procure for breaking rocks, and placed them under the direction of a person who was with me at the time I first observed the fossils.

The men have now returned unsuccessful in their attempts to break the rocks, containing the specimens for which they were sent.

Under these circumstances, it may be the most prudent way, before introducing a new, real, or supposed species, to inquire if the figures in question be really organic remains, or mere delineations formed by a peculiar arrangement of the distinct concretions of the rocks in which they are found. The consideration of this point is suggested partly by the remarks contained in your letter, and partly by a fragment of transition limestone, which has been brought to me containing ring-shaped delineations on its surface, which, if not quite similar to those represented in my former notice, are at least nearly allied to them. The accompanying drawing (fig. 4) is a faithful representation of the appearance on the limestone; the stone from which it was taken is much at your service: it was brought from the spot in which the other specimens are found. They occur in great quantity, and pass progressively into those represented in my first notice, and both appear to be but the two extremes of the same thing*. They occur only in rocks of

* Since the above was written I have met with an extremely interesting paper on Belemnites in the Phil. Transactions, 1754, by Mr. Brander, to which a plate is attached, containing various figures. No. 16 bears a strong resemblance

the same age, whether these be slate or limestone. On the other hand, we know that mere delineations on the surface of particular rocks, differ with the constitution of the rock in which they occur, are uncertain as to size, and are without any fixed regularity in the proportion of the different parts to each other; proving them to be either the result of mechanical increment or of chemical attraction. Respecting organic fossils, Cronstedt says, "They are distinguished by an organic structure more or less imperfect, of which as long as they bear any marks we are to reckon them as fossils of a foreign* species." With respect to your remarks on the rings, I can only account for the part of the lower and upper portions being both visible, by supposing the bodies to which they belonged to have been soft enough to yield to lateral pressure, and to have been thus converted into superficial substances. Others again, as fig. 1, may have been exposed to compression, which acted longitudinally, so as to destroy their length, but preserve the lateral dimensions.

It is unnecessary to remark that this explanation would not apply to any univalve shell with a regular spire; and that of univalve shells without regular spires, Dentalium is the only genus to which these appearances can be referred. The generic character of Dentalium is "shell awl-shaped, open at both ends." The rings are sufficiently characteristic to distinguish the species; but until we can procure good specimens, it is premature to be positive as to the place these fossils should occupy. I know the danger of touching fossil drawings without the specimens before one's eyes, and what shakes my confidence in the drawing attached to the former notice now is, that though it was accurately sketched from the specimens, yet it was finished from recollection only.

With respect to the drawing here attached, it is calculated to mislead as to the true nature of the fossils; were the figures complete, they would be found to be awl-shaped, the ends nearly equal in size,

to fig. 3, except that the Ponar fossil appears to have been perforated in the centre, while Mr. B.'s figure is merely grooved by external striæ, but in this respect, Mr. B. remarks, there is great variety—may not the Ponar fossil be a Belemnite, so worn and changed by the lapse of ages, as only to present the marks of former cells; the outer crusts being destroyed, and the traces of septæ and siphuncle only remaining—but taking the aggregated form of the rings, and assuming them to have been a shell; it certainly would have agreed with the modern genus Dentalium; but if by that we imply also the nature of the animal which formerly occupied it, we then go too far in attempting to define so imperfect a trace of the organization of a former world. In a chronological arrangement this fossil must take its place amongst the remains of the earliest created beings.

* "Foreign species," as here used, means foreign substance.

and apparently open ; there is also an appearance something like a detached spire, but this I take to be nothing but the fore-shortening of the rings, such as is represented in fig. 1, but less perfect. I may add, that I have not seen the trace of a spire or a whorl in all these appearances. Orthoceræ are long, straight, tapering shells, characters not one of which answer to these remains. One of the figures in the accompanying drawing resembles a fragment of an orthoceratite, but were it more complete, it would be awl-shaped. Now as to the mineral composition of the fossil in transition slate, I found the rings to be composed of a fine siliceous sandstone. In the limestone they are incorporated with, and similarly constituted, as the rock itself, so that they would elude the character of fossils, were it not for their more perfect existence in the transition slate. Having pointed out these appearances to your notice, as well as the locality in which they occur, their nature may be further inquired into by others, should the term of my residence in this quarter deprive me of the opportunity.

May, 1384.

[Being rather sceptical as to the appearance of the under-surface of the rings represented in Dr. McClelland's first notice, we mentioned our doubts to him, and were favored with the further explanation, dated in May, which by some accident was mislaid ; and we were forced to repeat our request for a duplicate. The great distance will account for the delay which has unfortunately occurred in its appearance. We are not yet satisfied, however, that the impressions are truly of a fossil nature, and we doubt whether any geologist would venture from such indistinct traces to pronounce an opinion of the genus of the fossil.—Ed.]

VI.—*Further notice of Influence of the Moon on Atmospherical Phenomena. By the Rev.* R. Everest, *M. G. S. &c.*

In my last paper, I urged the probability of the dew-points varying with the declination of the moon, and from that was naturally led to the conclusion that the rain-falls would vary in a similar manner. Having, therefore, obtained the Nautical Almanack for the year 1823, and having by me the register of rain-fall for the two months of August and September in that year, I made out a table for comparison, placing the rain-fall in one column, and the declination of the moon in an adjoining one beside it, and her semi-diameter in the next to that; on the other side, the days of the month in succession, and on the other side of them again, the declination of the sun. If we recollect that the latitude of Calcutta is about 22° 23′ N., we may see by this table that a greater proportion of rain falls when the declination of the moon (either north or south) is near about the same as the latitude of the place, and that the proportion lessens as

she advances towards the Equator. To make this more clear, let us take the average of rain-fall on the days when the moon's declination is great, and compare them with those when it is less, and we shall find the following results.

In August, 1823.

The average rain-fall for each day, when the declination of the moon (either south or north) was greater than 18° was ..... 0.826 inches.
When the declination of the moon was between 18° and 9° it was 0.330
When the declination of the moon was between 9° and 0° it was 0.174

In September.

When the declination of the moon was above 18° it was..... 0.656
When between 18° and 9°, ... 0.151
When between 9° and 0°, ... 0.297

An exception to the former observation will be noticed here, since in September, the average, when the moon is between 9° and 0°, exceeds that when she is between 18° and 9°. This I take to be owing to the course of the sun, whose declination is between 9° and 0° in the month of September, and at that time of year, the days when the declination of the moon is within those limits are also the days of conjunction and opposition. As the divisions I have adopted for illustration are merely arbitrary, any others may be substituted for them. Thus, if we take the average (for the two months) of the days of maximum declination of the moon, of one day before, and two days after that, we get an average of 1.17 inches for each day. In this case, there is an excess, probably owing to the locality of Calcutta, a place which having a great extent of ocean to the south, is more exposed to the influx of currents from the ocean, when the moon gets to the north of it. But on this I hope to be able to speak farther hereafter. In the period included in the table there are six days, on each of which the rain-fall was greater than two inches. I here subjoin them, with the corresponding declination of the moon.

1823.	Inches of Rain.	Decl. of Moon.
August 2nd, ...	2.14	26° 2′ N.
Ditto 16th,.....	3.32	26 12 S.
Ditto 17th, ...	2.56	25 9 S.
Ditto 18th, ...	3.00	22 59
September 25th, ...	2.68	25 0 N.
Ditto 26th, ...	4.60	25 59

I have also been able to obtain the registers for the last two months of the year 1824, and for the first three months of the year 1825. In this period a few items of rain are registered, which are as follow:

1824.	Inches of Rain.	Decl. of Moon.
November 22nd,	0.92	24° 1′ S.
Ditto 23rd, ...	2.20	23 5
Ditto 24th, ...	0.01	20 59
December 3rd, ..	0.78	17 29 N.
Ditto 4th, ...	1.46	20 44
Ditto 5th, ...	0.40	23 0
Ditto 31st, ...	0.08	19 35

1825.	Rain-fall.	Moon's Decl.
February 10th, ..	0.08	22° 6′ S.
Ditto 17th, ...	0.08	9 35
Ditto 22nd, ...	0.02	13 20 N.
March 1st, ...	0.40	19 15
Ditto 2nd, ...	0.66	15 8
Ditto 8th, ...	0.04	17 51 S.
Ditto 10th, ...	0.08	23 4
Ditto 16th, ...	0.02	10 36
Ditto 19th, ...	0.02	3 14 N.
Ditto 20th, ...	0.10	7 50
Ditto 21st,.....	0.90	12 10
Ditto 22nd, ...	0.60	26 1

TABLE—*Shewing the quantity of Rain in Inches and Decimals that fell in the months of August and September, 1823, with the Declination of the Moon, to the nearest minute, at noon, on the corresponding days, also her Semidiameter ditto, and Sun's Declination ditto.*

August.					September.					
D. of M.	Sun's Declin.	Rain.	Moon's Declin.	Moon's Semid.	D. of M.	Sun's Declin.	Rain.	Moon's Declin.	Moon's Semid.	
	° ′		° ′	′ ″		° ′		° ′	′ ″	Calcutta. ° ′
1	18 11	..	24 14N.	16 5	1	8 30	....	22 18	16 23	Lat. N. .. 22.28
2	17 56	2.14	26 2	16 18	2	8 8	....	18 3	16 26	Average daily rain-
3	17 41	1.28	26 7	16 28	3	7 46	....	12 40	16 25	fall on each day
4	17 25	0.60	24 21	16 37	4	7 24	....	6 36	16 20	when the Moon's
5	17 9	0.01	20 50	16 38	5	7 2	....	0 17N.	16 12	Dec.is greater than
6	16 53	..	15 56	16 30	6	6 39	0.05	5 55 S.	16 1	18° or about 4° 30
7	16 36	..	10 6	16 29	7	6 17	0.02	11 41	15 47	on each side the
8	16 19	..	3 49	16 48	8	5 55	0.10	16 43	15 34	zenith of Calcutta.
9	16 2	0.01	2 28 S.	16 49	9	5 32	..	20 48	15 20	In August, 0.826
10	15 45	0.06	8 28	15 49	10	5 9	0.16	23 47	15 9	In ditto, when
11	15 27	1.18	13 52	15 34	11	4 46	0.44	25 35	14 59	Moon's Dec. is
12	15 10	0.32	18 29	15 20	12	4 24	0.68	26 7	14 52	between 18°
13	14 52	0.20	22 8	15 7	13	4 1	0.28	25 27	14 47	and 9°.... 0.330
14	14 33	..	24 41	14 58	14	3 38	0.40	23 38	14 46	In ditto, be-
15	14 15	0.52	26 3	14 51	15	3 15	..	20 47	14 46	tween 9°
16	13 56	3.32	26 12	14 46	16	2 51	..	17 3	14 50	and 0°,.... 0.174
17	13 37	2.56	25 9	14 44	17	2 28	0.38	12 36	14 55	Average daily
18	13 18	3.00	22 59	14 44	18	2 5	..	7 35	15 2	rain-fall in
19	12 59	0.14	19 49	14 46	19	1 42	1.20	2 11 S.	15 10	Sept. when
20	12 39	0.10	15 49	14 56	20	1 18	0.22	3 23N.	15 18	the Moon's
21	12 19	0.46	11 9	14 54	21	0 55	0.60	8 55	15 27	Dec. is above
22	11 59	0.62	6 0	15 0	22	0 32	0.28	14 9	15 35	18°,..... 0.656
23	11 39	0.18	0 33 S.	15 7	23	0 8	0.30	18 47	15 43	Between 18°
24	11 19	..	5 0 N.	15 15	24	0 14S	0.28	22 31	15 50	and 9°, .. 0.151
25	10 58	0.17	10 25	15 23	25	0 37	2.68	25 0	15 57	Between 9°
26	10 37	0.40	15 30	15 33	26	1 1	4.60	25 59	16 2	and 0,.... 0.297
27	10 17	0.06	19 55	15 44	27	1 24	0.42	25 20	16 6	
28	9 55	0.03	23 23	15 51	28	1 48	0.12	23 4	16 10	
29	9 34	0.30	25 34	16 1	29	2 11	0.13	19 20	16 12	
30	9 13	0.02	26 12	16 10	30	2 35	0.28	14 28	16 12	
31	8 51	0.01	25 6	16 17						
		17.69					13.62			

It may be observed that (with one exception) the items of rain, which fell with a low declination of the moon, in the two last months, may be attributed to the effect of the conjunction and opposition of the sun. Should this predominance of rain about the maximum declination of the moon be found to obtain generally, it will account for the third day before the new moon, and the 11th and 12th after, being maxima—a circumstance which I noticed in my former paper, but was unable to explain. The rainy-season lasts more or less from the 21st June to the 21st September? Now the day of new moon nearest the 21st June is nearly or actually the same with that of maximum north declination. But as the sun leaves the northern tropic, the days of maximum declination gradually separate from those of conjunction and opposition, till by the time he is at the equator, they have reached the quarters.

In adding up, therefore, the sums of rain which fell in successive lunar revolutions, the chances were, that the third day before, and 11th and 12th after, new moon, would be the maxima, as they were (upon the whole) nearest to those of maximum declination of the moon. I hope shortly to obtain a sight of the Nautical Almanacks for some other years, and to have the honour of laying the results (whatever they may be) of a comparision of them, with the registers, before the Society. It only remains for me to explain, why I preferred comparing the amounts of rain-fall, and the fluctuations of the dew-points with the changes of the moon, to comparing the heights of the barometer with the same, and as this latter plan has been suggested to me from a highly esteemed quarter, I lose no time in replying. I first beg to refer him to Daniell's Meteorological Essays, (1829), page 136, and to assure him, that I agree with the observations there made, viz. "That the total weight of the perpendicular column would not be affected so much as that of its horizontal sections; and the amount of the lunar influence should be sought in the variations of the differences of density between some high elevation and the level of the sea," &c.

For example, supposing a case where the aërial fluid was at rest (the pressure being equal every where). Now, if any inequality were to be caused (either by the presence of a luminary above the horizon or otherwise) a current would instantly be set in motion to restore the equilibrium, and any inequality, beyond what was necessary to overcome the inertia of the air, would instantly be counteracted by an increased velocity of current. But in estimating the rain-fall and dew-points together, we get the sum of the effect produced—the accumulated results of successive tides or currents. If we reflect what a small difference of level is sufficient to set water in motion, we cannot

but suppose that a very small inequality of pressure would be sufficient in the case of air. Such an inequality is no doubt caused by the action of the moon. Mr. Howard found, on an average of 10 years at London, that the barometer stood 0.10 (I quote from recollection) lower at change and full, than when the moon was in the quarters. No such inequality could be found in this climate, though a difference to a small amount may be detected. If the Editor will refer to the Table No. 3, annexed to my last paper, he will see that I did attempt such comparisons as he speaks of, with the barometer; but left them off, owing to the results being less satisfactory than those derived from the rain-fall and dew-points. I must acknowledge that it is by the indications of the barometer alone, that we can ever hope to include the atmospheric changes within the precise limits of a mathematical formula; but if we are precluded from this, we are not therefore debarred from adopting a more indirect and humble line of investigation, which, though it can claim no praise for ingenuity of research, may yet present us with some results of general usefulness. If we can obtain one additional presage of an approaching storm—if we can indicate with some probability the year of drought and famine, our time has not been misemployed, nor our labors wholly fruitless.

I perceive that the effect of the moon's declination is felt in the rain-falls in England, though but slightly, as was to be expected.

VII.—*Correction of a mistake regarding some of the Roman coins found in the Tope at Manikyala opened by* M. Court. *By Lieut.* Alexander Cunningham, *Engineers.*

[We hasten to insert the following extract from a letter just received, as the corrections pointed out appear to be in every case judicious,—in the case of *Lariscolus* conclusive. We compliment our young friend upon the success with which he has commenced his numismatic studies, and shall always be happy to profit by his criticisms.—Ed.]

I take the liberty of addressing you on the subject of the coins found in the second tope at Manikyala by Mons. Court, as I conceive you have made a great mistake in the age of one of the Roman coins, and it is from this very coin that you fix the date of the erection of the tope.—The coin I mean is No. 22. You remark that the *helmeted figure* on this coin and the *unintelligible inscription* on the reverse lead you to ascribe it to the age of the Emperor Constantine: now these very observations of yours, setting aside the appearance of the coin, convince me that it is of the time of the Commonwealth; and I take it to be one of the Gens Herennia, of which there are 15 varieties: it may however be one of the Gens Quinctia, of which there

are 12 varieties—but as I have no books for reference I shall be much obliged if you will look over the coins of the families, and settle the point. The style of the coin is exactly the same as those of the times of the consuls, and very different from those of the age of Constantine. The obverse is either a head of Roma or of Libertas, and the ornaments upon the helmet are peculiar to the early Roman coins. The reverse is a common device upon the coins of families, and represents two soldiers fighting, with one fallen between them, while victory is hovering over their heads. You say of the two combatants that one is clad as a Roman, and query whether the other as a German: if the coin is of the age of Constantine, by what means has the German got there? My opinion is that the coin is one of Quintus Herennius, with perhaps the cognomen Marcomannus, or some other name obtained from the earlier enemies of Rome. At any rate the age of the coin can be decided by this—If it is a coin of the families, it must be pretty *thick*—if of the age of Constantine, *thin*.

The remaining three silver coins, you say, are in too imperfect a state to be identified: I agree with you that Figs. 24 and 25 are too much worn to be identified—though they both appear to me to be of the times of the consuls—No. 25 has the appearance of a Parthian coin. No. 23 you say 'bears the final letters of the word CÆSARIS'—but I think I can show that you are wrong. What you call the final letters of the word *Cæsaris* are the commencing letters of the man's name who struck the coin. The word is LARISCOLUS, which was the cognomen of Publius Accoleius. This coin is the only known specimen of the *Gens Accoleia*, and the whole inscription should be P. ACCOLEIUS LARISCOLUS—The reverse is a play upon his cognomen of Lariscolus or the Larch Tree; and although the coin is much worn, yet the three sisters of Phaëton may still be seen just commencing their metamorphoses into Larch trees.—The story is related by Ovid*.

Of these seven coins found in the second tope at Manikyála, not one can be proved to be of a later date than the birth of Christ. What is the inference? That the tope must have been constructed about the commencement of the Christian era; and the coins may have belonged to the soldiers of the army which Antony led into Parthia, and it is known from history that they lost most of their baggage on that expedition. If, as you say, the tope is of the age of Constantine, why were there no coins deposited in it of a later date than the birth of Christ, when it is well known that Roman coins of the second and

* See Edinburgh Encyclopedia, Art. *Numismatology*; the plate contains a facsimile of this very coin.—Ed.

third centuries after Christ are often found in the Punjab and in India itself, as may be seen by referring to the pages of your Journal*.

At page 311, Vol. II. of the Journal, you describe a coin, shown in Plate VIII. Fig. 1 of coins, as of ALEXANDER the Great, 'having a fine juvenile portrait of the conqueror before he assumed the horn of Ammon; and, on the reverse, Apollo seated on the peculiar oracular seat,' &c. If this is a coin of ALEXANDER the Great, what is the meaning of the following note at page 32, vol. ii.? This coin of DEMETRIUS is recognized to be *Seleucidan* from the figure of *Apollo sitting upon a peculiar altar*, described by PINKERTON as a 'hamper inverted!' Now the *reverses* of these two coins are *alike*, consequently if one is *known* to be *Seleucidan* from its *reverse*, the other must also be Seleucidan;—add to this, the coins of ALEXANDER the Great have no *numerals* upon them, and very few, if any, have *titles*. In my opinion it is a coin of ALEXANDER 1st, or BALA of Syria, who bore the very title of *Euergetes* which is upon this coin†.

At page 406, vol. ii.—on a coin of APOLLODOTUS you remark that 'the introduction of the conjunction KAI you do not remember to have seen on any other Greek coin.' Out of only 30 Greek coins in my possession there is one conjunction KAI upon it—but I believe it is not common upon Greek coins.

I should like to see Fig. 13, Plate II. of Roman coins, as it seems a very curious one. I have many remarks to make upon Mons. MASSON'S collection of coins, but I must defer them until I know whether those I have already made are acceptable or not. I hope you will pardon the liberty I take not only in addressing you, but in differing from you in opinion.

* The existence of the *Rao Nano Rao* coins in M. COURT'S tope prove it to belong to nearly the same epoch as the neighbouring monument opened by Gen. VENTURA, in which Sassanian coins of the seventh century (according to SACY and FRŒHN, were discovered. Although therefore, taken alone, the Roman coins would raise the antiquity of the tope to a period somewhat posterior to the time of ANTONY'S expedition, still in combination with the other facts, they cannot set aside the more modern date of deposit: and the inference is stronger than ever, of their having been antiques at the time, and of the party buried there having been an antiquary in his day.—ED.

† The title of ALEXANDER I. was *Philopator* and not *Theopator*; however there is every probability of the coin belonging to him. It was ascribed to ALEXANDER the Great, principally from the handsome youthful features of the monarch.—ED.

VIII.—*Description of the Fossil Elephant's Tooth from Sumrotee, near Náhun. By Lieut.* W. E. Baker, *Engineers.*

[In a letter to the Editor.]

In fulfilment of the promise made to Capt. Cautley, I have the pleasure to enclose a sketch, (Plate XXXVI.) drawn to half size, of the fossil tooth presented to me by the Náhun Rája, and stated by him to have been found at a place called Sumrotee, about 30 coss in a westerly direction from Náhun. Concerning the exact situation of this place there is still considerable doubt, but as Lieut. Durand has sent out persons in quest of it, we hope soon to determine its locality, and to be enabled to prosecute our researches whenever opportunity may offer. We could get no certain account of the formation in which this fossil was found imbedded, but the substance of which, small portions were found adhering to the specimen, appears to be a ferruginous sound.

I have not the means of comparing this with other fossil elephant's teeth; but I beg to call your attention to two points, which *may be* of importance, and which the imperfection of the drawing might prevent your remarking.

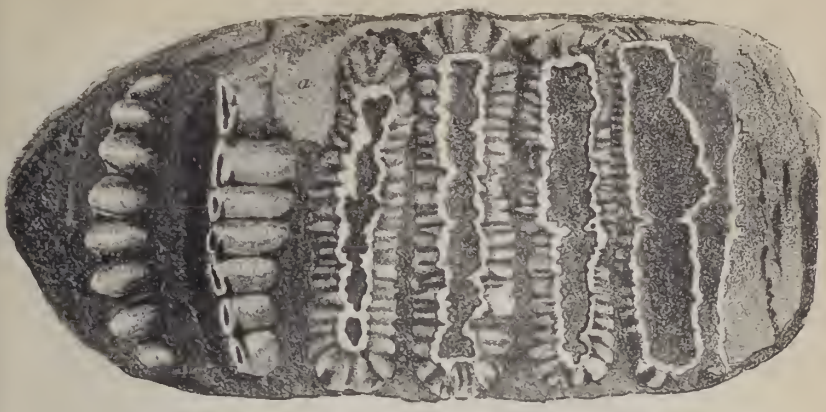
First, the great prominence of the molar ridges, particularly at one end, viz. the left of the drawing.

Secondly, the part that were the "crusta petrosa" has been broken away, the bone below it appears perfectly continuous, and not divided into separate plates. I may add, that the great general convexity of the grinding surface seems to show that this tooth belonged to the upper jaw, and that the fractured appearance of one of the ends proves that it once extended further in that direction. The colour of the "crusta petrosa" is a dull black. The bony parts where they are discovered, as well as the prominent ridges of enamel, are of a lighter tint, and the surfaces of the latter are highly polished.

Dádupur, November 16*th*, 1834.

[We should make the same remark on inspection of the present drawing, as on first receiving the fossil tooth from Jabalpur*, that there is nothing to distinguish it (the animal that bore it) from the existing species of elephant, to the drawings of which in Cuvier's *Ossemens Fossiles*, (which are not engraved in a style suited to very accurate comparison,) it bears a stronger resemblance, than to those of the fossil elephant's tooth. We are happy to perceive that the Asiatic Society is now in a fair way of possessing a splendid museum of the fossil riches of this newly discovered or re-discovered tract of country, through the exertions of Captain Cautley, Lieut. Baker, and Colonel Colvin, all three engineer officers on the spot, and all equally zealous and disinterested in promoting the objects of science.—Ed.

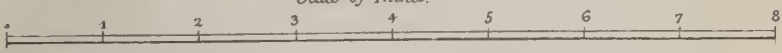
* Journal Asiatic Society, Vol. II. page 585.



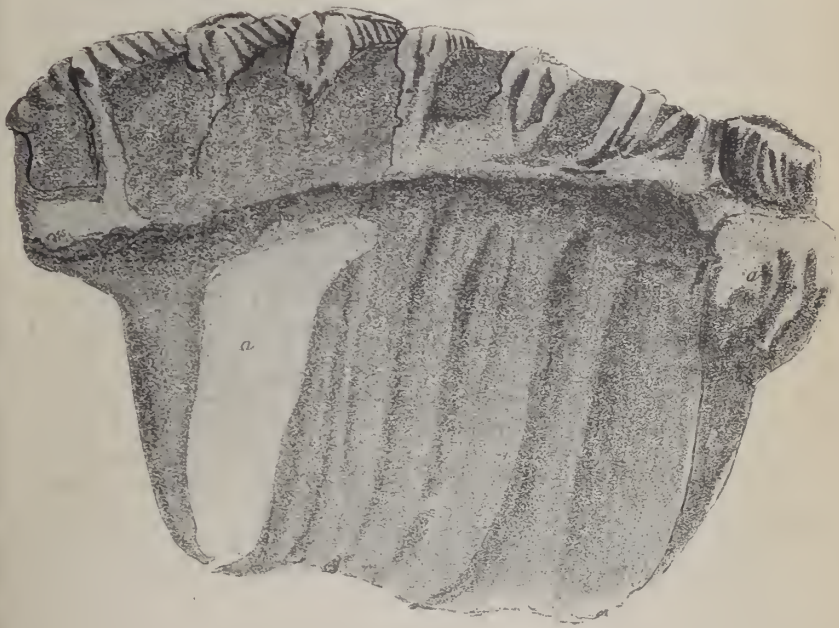
Drawing of a FOSSIL TOOTH

said to have been found at SUMROTEE *west of* NAHUN.

Scale of Inches.



a, a, a, represent fragments of indurated sand adhering to the fossil.



W. E. Baker del.

J. B. Tassin lith.

IX.—*Catalogue of Birds (systematically arranged) of the Rasorial, Grallatorial, and Natatorial Orders, observed in the Dukhun, by Lieut.-Colonel* W. H. Sykes, *Bombay Army, F.L.S., F.Z.S., &c. &c.*

[Continued from p. 598.]

160. Francolinus spadiceus. *Franc. castaneus suprà fusco tinctus, plumarum maryinibus dilutioribus; capite, collo, ventre, crisso, tegminibusque caudæ inferiaribus fusca-brunneis; vertice nigrescenti-brunneo; plumarum ventris crissique rhachibus elongatis, acutis.*

Fœm. *Suprà nigra castaneaque varius; pectoris abdominisque plumis castaneis ad apices lunulâ latâ nigrâ notatis.*

Pullus. *Fusca-ferrugineus, vittis tribus dorsalibus latis, intermediâ saturatè rufo-brunneâ, lateralibus flavescenti-albidis.*

Irides rufo-brunneæ. *Rostrum pedesque* rufescenti-cornei. Longitudo *corporis* 9.7 unc., *caudæ* 5.

Perdix spadicea, Lath., Ind. Orn. 2. 644. 4. Temm., Gall. Ind. 719. *Tetrao spadiceus*, Gmel., Syst. Nat. 1. 759. 29. *Le Perdix rouge de Madagascar*, Sonn., Voy. Ind. 2. 169. *Francalin spadice*, Temm., Pig. et Gall. 3. 315. *Koku-tree* of the Mahrattas.

The male only of this bird, which is very common in the thick brushwood of the Ghauts, appears to have been known to the writers quoted. Colonel Sykes has had both sexes alive in his possession for some time, and has no doubt they might be successfully introduced into Europe. They are excellent eating. Rarely take to wing or perch. Male has a harsh call of three syllables, *Kat-kut-ree*, whence the Mahratta name; female in confinement uttered little notes like the twittering of a chicken. A male in Col. Sykes's collection has three large spurs on one leg, and two on the other.

Genus *Pterocles*, Temm *Gunga*.

161. *Pterocles exustus*, Temm., Pl. Col. 354 & 360. *Rock Pigeon* of Europeans in the Dukhun.

A very common bird in the Dukhun; gregarious; frequenting open stony plains only. Characterized by the height at which it flies, the rapidity of its flight, and its peculiar and piercing note announcing its approach ere it can be well seen. It feeds on a quadrangular hard small seed, which Colonel Sykes has found in the stomach of only one other bird.

Irides reddish brown. Sexes of the same size. The male has two of the tail-feathers linear and elongated, which is not the case with the female. Male, inclusive of tail, 14.2 inches: tail 5 inches.

162. *Pterocles quadricinctus*, Temm., Gall. 3. 252. *Painted Rock Pigeon* of the Dukhun.

Rare, and met with only in pairs, on open ground, at the foot of hills. *Irides*, reddish brown. Sexes of the same size. Length, inclusive of tail, 13½ inches: tail 3 inches.

Genus *Hemipodius*.

163. *Hemipodius pugnax*, Temm., Pl. Col. 60. fig. 2.

Common in the Dukhun, and called the *Bustard Quail* by Europeans. Its reputed pugnacious qualities are not known. Solitary, or in pairs, and mostly found in *Chillee* fields *(Capsicum annuum)*. *Irides*, light yellow. Length, inclusive of tail, 7.5 inches: tail 1.5 inch. Habits, tongue, and internal organization of *Coturnix textilis*. M. Temminck describes the female as differing in plumage from the male; but in Colonel Sykes's specimens the sexes are exactly alike.

164. Hemipodius Taigoor. *Hem. suprà castaneus, plumis stramineo marginatis, nigroque undulatim fasciatis; tegminibus alarum stramineis nigro fasciatis; remigibus fuscis; mento guláque albis; pectare nigro alboque fasciata; ventre crissoque dilutè ferrugineis.*

Irides, pallidè flavæ. *Rostrum* nigrescens. Longitudo *carporis* 4.8 unc., *caudæ* 1.7.

Closely resembles the female of *Hem. pugnax*, as described by M. Temminck, but the bill is longer and more slender, and Colonel Sykes has specimens of both sexes. Sexes alike.

165. *Hemipodius Dessumier*, Temm., Pl. Col. Called the *Button Quail* by Europeans.

Colonel Sykes never met with this bird otherwise than solitary: frequents thick grass or pulse fields, and sits so close as to expose itself to be trod upon. Flight

so abrupt and short, that ere the gun is well up to the shoulder, the bird is down again. *Irides*, straw-yellow. Length, inclusive of tail, 5.7 inches: tail 1.4 inches.

Fam. *Struthionidæ*, Vigors.—Genus *Otis*, Linn. *Bustard.*

166. *Otis nigriceps*, Gold's Cent. Himal. Birds.

This noble bird is so common in the Dukhun, that one gentleman has shot nearly a thousand. Gregarious. Egg, a perfect oval, brown olive, with obscure blotches of darker brown olive. Length 3.4 inches, diameter 2.7 inches. One only found in a hole in the earth on the open plain, and that considerably advanced in the process of incubation. *Irides*, deep brown. Length, male, inclusive of tail, 56¼ inches: tail 13¼ inches. Female 41¼ inches, inclusive of tail of 10½ inches. Male supplied with the remarkable gular pouch common to the *Otis tarda.*

167. Otis fulva. *Ot. suprà cacaotico-brunnea, plumis fulvo marginatis variegatisque; tegminibus alarum, collo, pectoreque fulvis, punctis lineisve brunneis parcè notatis; ventre, uropygio, femoribus, tegminibusque caudæ inferioribus fulvo-albis: tegminibus alarum inferioribus latcribusque cacaotico-nigris; caudâ fulvâ fasciis quatuor cacaotico-brunneis notatâ; mento gulâque albis; vertice brunneo, strigâ mediâ longitudinali albâ.*

Irides rufescenti-lutescentes, radiis a pupillâ pallidè lutescentibus. *Pedes* flavescentes. Longitudo *corporis* ♂, 15.6 unc., *caudæ* 3.4: *corporis* ♀, 17.4, *caudæ* 3.4.

The wings are of unequal length in the sexes; and the quills are singularly acuminated.

Col. Sykes gives the following detailed description of the *Otis fulva:* Forehead, crown, back, scapulars, and first three quills rich chocolate brown; feathers of the back and scapulars triangular at the point, edged with fulvous, and barred in the centre and near the base with a broad bar of fulvous, mottled with chocolate. Round the eyes, a streak down the centre of the crown, whole neck, breast, wing-coverts, and tail buff or fulvous; the back neck closely speckled with minute dots of brown. On the wing-coverts a few scattered lines and specks of brown. Tail with four distant fuscous bars, the intermediate spaces beautifully barred with flexuose lines of fuscous. The fourth and following quills and secondaries marked like the tail. Two irregular fuscous streaks down the fore neck. Breast fulvous, with a few faint lines and spots of brown. Belly, vent, under tail-coverts, and thighs yellowish white. Under wing-coverts and sides of the body fine chocolate brown. Occasionally a feather is tipped with white on the wing-coverts. Upper mandible fuscous, lower yellowish. Chin and throat white, extending up towards the ears. Sexes exactly alike in plumage. The down at the base of all the feathers pink. Primary quills singularly acuminated, particularly in the male, terminating in a point as fine as that of a needle; less so in the female, and the wings of the latter are from one to two inches longer than those of the female. This difference is constant.

Col. Sykes stated that his description was written from eight specimens lying before him, and that he had transmitted three similar to the India House.

Some of Col. Sykes's sporting friends in India having expressed a belief that the *Otis fulva* was the female of the *black Floriken* of the Dukhun, (a comparatively rare bird, the *Otis fulva* being common,) he was induced to pay particular attention to the organs of sex, and never found the *testes* and *ova* otherwise than fully developed. If therefore it be referrible as an immature bird to a known species, (*Otis Bengalensis, Otis aurita,* or *Otis Indica,*) it appears in the Dukhun in hundreds, with all the indications of puberty, at a time when the supposed parents are rarely, if at all, to be met with. Col. Sykes's birds are identical with a specimen laid before the Society by Major Franklin on the 9th of August, 1831, under the name of *Otis Indica;* Major Franklin, at the same time, expressing doubts of it being the *white-chinned Bustard* of Dr. Latham. The description of the *Otis Indica* has only two features common to the *Otis fulva,* "chin white," and "under parts dusky yellowish cream colour;" as they differ in all other particulars, the birds cannot be identical; and a reference to a figure of the *Otis Indica,* which is only to be met with in J. H. Miller, confirms the impression. Col. Sykes believes with Major Franklin that the present species has been usually mistaken for the female of *Otis aurita.*—A correspondent in the Magazine of Natural History, No. 16, for November, 1830, under the signature of "A Subscriber," page 517, confirms Col. Sykes's opinion, stating that the *Churj* or *ochreous Floriken* (*small Bustard* of India) is not the *Otis Indica (white-chinned Bustard),* nor the *Otis Bengalensis,* nor the *black Floriken (Otis aurita)* or *Leek* of Hindostan.

Col. Sykes stated the food of the *Otis nigriceps* and the *Otis fulva* to be almost exclusively grasshoppers; and he pointed out the absence of a gizzard (the stomach being simple), combined with the remarkable shortness of the intestinal canal, scarcely exceeding the length of the body, as distinguishing these birds from all others that had come under his observation.

ORDER IV. GRALLATORES, *Ill.*

Fam. *Gruidæ*, Vigors.—Genus *Grus*, Pallas. *Crane.*

168. *Grus Antigone*, Steph., 11. 531. *Grus orientalis Indica*, Briss., Orn. 5. 378. 7. *Kullum* of the Mahrattas.

Appear in flocks of hundreds in Dukhun during the cold season.

Fam. *Ardeidæ*, Leach.—Genus *Ardea*, Auct.

Section A. *Tarsi* long.

169. *Ardea Egretta*, Gmel., 1. 629. *Ardea Torra*, Buch. Franklin, Zool. Proceedings. *La Grand Egrette*, Buff., Ois. 7. 377. Pl. Enl. 925. *Large white Heron with yellow bill.*

Length, inclusive of tail, 35 to 36 inches : tail 5.8 inches. Length of the European bird 42 inches. *Irides* bright yellow. Solitary.

170. *Ardea Garzetta*, Linn., 1. 937. *L'Aigrette*, Buff., Ois. 7. 372. Pl. Enl. 901. *Little Egret Heron.*

Length, inclusive of tail, 24 to 25 inches : tail 4 inches. Length of the European bird 24 inches. *Irides* light yellow.

Gregarious. Toes, as in the European bird, yellowish green or apple green, exhibiting a curious contrast to the greenish black of the legs.

171. ARDEA ASHA. *Ard. suprà ardosiacea, dorso brunnescente; mento, gutâ lineâ longitudinali jugulari, corpore subtùs, tegminibusque caudæ inferioribus albissimis; tegminibus alarum tertiariis albo angustè marginatis.*

Irides dilutè flavæ. *Rostrum* corueum. *Tarsi* virescenti nigri. Longitudo *corporis* 20½ unc., *caudæ* 3½.

State-coloured Heron.

A very rare bird in Dukhun. Has a good deal the aspect of *Ard. Novæ Hollandiæ*, and several points of resemhlance to *Ard. gularis*, *Ard. jugularis*, and the young of *Ard. cærulea*; but differs from all.

172. *Ardea cinerea*, Lath., Ind. Orn. 2. 691. 54. *Le Heron huppé*, Buff., Ois. 7. 342. Pl. Enl. 787.

Irides bright-light yellow. Length, inclusive of tail, 38 inches : tail 6 inches. Identical with European specimens. Solitary.

173. *Ardea nigrirostris*, Gray, Zool. Misc. 20. Fig. Ind. Zool. Part 12th. *Large white Heron with black bill.*

Differing only in having a black bill from *Ard. Egretta*; otherwise identical in size, form, colour, and internal organization ; nevertheless, as Col. SYKES has adult birds preserving the black bill, he considers Mr. GRAY'S specific distinction valid. *Irides* bright yellow.

Section B. *Tarsi* short.

174. *Ardea Malaccensis*, Gmel., 1. 643. *Crabier blanc et brun de Malacca*, Buff., Ois. 7. 394. Pl. Enl. 911. *Buglah* of the Mahrattas.

Irides light bright yellow. Length, inclusive of tail, 19 inches : tail 3 to 3½ inches. One male bird measured 21 inches. White capillary worms found on the mesentery.

175. *Ardea Caboga*, Penn., Hindoos. 2. 158. *Gibraltar Heron*, Lath., var. A. *Small pure white Heron. Batty bird* of Europeans in Dukhun.

Attend oxen while grazing, and pick insects from them. Gregarious. Length, inclusive of tail, 19½ to 21 inches : tail 3½ inches. *Irides* bright yellow. A shade of yellow ochre on the forehead in some individuals.

176. ARDEA GRAYII. *Ard. alba; dorso atro-rubente; capite, collo, pectore, scapularibusque sordidè flavescenti-albidis; occipitis plumis 3—5 longis, lincaribus, albissimis.*

Irides nitidè flavæ. *Rostrum* ad apicem nigrum, ad basin flavescens. *Tarsi* fuscescenti-carnei. Longitudo (caudâ inclusâ) 18½—19¾ unc., *caudæ* 3.

Marone-backed Heron.

The deep chestnut or marone feathers of the back are decomposed, and extend nearly to the end of the tail. The immature bird bears a very close resemblance to the *Ard. Malaccensis.*

177. *Ardea Javanica*, Horsf., Linn. Trans. 13. 190. *Indian green Heron* of Dr. LATHAM, No. 74.

Col. SYKES's specimens are identical with those from Java, and on comparing them with the descriptions of *Ard. virescens*, Ill., and the plate of BUFFON, (Pl. Enl. 908, *Crabier de Cayenne,*) they differ in wanting the red stripes down the throat and neck, and in the tail being dark metallic green instead of black, and in smaller size. Dr. HORSFIELD'S trivial name is therefore valid. *Irides* bright light yellow, surrounded by a very narrow red riug. Length, inclusive of tail, 16½ iuches : tail 2½. Sexes alike in size and plumage. Solitary on the woody banks of small streams.

178. *Ardea cinnamomea*, Gmel., 1. 643. *Entire chestnut Heron.* Identical with

specimens in the British Museum and India House. Length, inclusive of tail, 15¾ inches: tail 2¼ inches. *Irides* bright yellow.

Rare in Dukhun. Mostly solitary; never gregarious. Remarkably wary.

Genus *Botaurus*, Briss. *Bittern.*

179. *Botaurus stellaris*, Briss., Orn. 5. 444. *Ardea stellaris*, Linn., 1. 239. 21. *Le Butor*, Buff., Ois. 7. 411. Pl. Enl. 789. *Common Bittern.*

Identical with the European bird.

Rare in Dukhun.

Genus *Nycticorax*, Steph.

180. *Nycticorax Europæus*, Steph., 11. 609. *Ardea Nycticorax*, Linn., 1. 235. 9. *Le Bihoreau*, Buff., Ois. 7. 435. Pl. Enl. 758. *Night Heron.*

Irides broad, crimson. Length, inclusive of tail, 24 inches: tail 4.2 inches. Length of the European bird about 22 inches. *Irides* and legs of the same colour as those of the Asiatic bird.

Genus *Phœnicopterus*, Linn. *Flamingo.*

181. *Phœnicopterus ruber*, Linn., 1. 230. *Le Flammant*, Buff. Ois. 8. 475. Pl. Enl. 63. *Red Flamingo. Rajah Huns* of the Hindoos.

Irides light yellow. Length, inclusive of tail, 43½ inches: tail 6 inches.

In the *duodenum* of a female were found two thick, remarkably white worms composed of *annuli;* one 7 inches long, the other 4½ inches; and filling up the intestinal canal, so that liquid food only could have passed; nevertheless the bird appeared quite healthy.

Genus *Platalea*, Linn. *Spoonbill.*

182. *Platalea leucorodia*, Linn., 1. 231. 1. *La Spatule*, Buff., Ois. 7. 448. Pl. Enl. 405. *Crested white Spoonbill.*

Irides crimson. Length, inclusive of tail, 35½ inches: tail 5½ inches.

Although a little larger in size, it is otherwise absolutely identical with the European bird, even to the colour of the *irides* and legs.

183. *Platalea junior.* The feathers with black shafts.

Mr. Stephens describes these birds as rarely occurring inland. Col. S.'s specimens were obtained 100 miles from the sea, and at an elevation of 2000 feet.

Genus *Ciconia*, Ray. *Stork.*

184. *Ciconia leucocephala. Ardea leucocephala*, Gmel., 1. 642. Latb., Ind. Orn. 2. 699. 78. *Le Heron Violet*, Buff., Ois. 7. 370. *Heron de la côte de Coromandel*, Buff., Pl. Enl. 906. *Violet Heron. Kandehsur* or *Kowruw* of the Mahrattas.

It is singular that this well-marked bird should have been classed as a *Heron* for a long period, and remain as such at the present moment in Shaw. Length, inclusive of tail, 33 to 34½ inches: tail 8 inches.

Mostly seen on open stony plains, or in ploughed fields. Food chiefly grasshoppers. Monogamous. *Irides* scarlet, margined with a narrow circle of black and an exterior circle of yellowish.

185. *Ciconia Argala*, Steph., vol. 11. p. 622. *Ardea dubia*, Gmel., 1. 624. *Ardea Argala*, Lath.

Is met with in Dukhun; but Col. Sykes has not a specimen. Called the *Adjutant* by Europeans, from its stiff soldier-like strut.

Genus *Anastomus*, Ill. · *Courly.*

186. *Anastomus Typus*, Temm. *An. Coromandelianus*, Steph., 11. 632. *Ardea Coromandelica* (l'adulte) et *Ponticeriana* (le jeune), Temm. *Le bec ouvert des Indes*, Sonn. Voy. 2. pl. in p. 219. Buff., Ois. 7. 409. Pl. Enl. 932. *Cinereous Muscle-catcher.*

Irides bright yellow. Length, inclusive of tail, 32 to 33 inches: tail 6¾ to 6¾ inches.

Buffon's figure is excellent. Lives on the animals of a new and large species of *Unio.* The stomach of this bird is not less remarkable than its bill: the last exhibiting a beautiful adaptation of means to their end; the form of the mandibles enabling the bird to hold and open the bivalve shell of the *Unio.* Solitary.

The proportional length of the intestinal canal exceeds that of any other bird in the order *Grallatores*, in one specimen being five times the length of the body, neck and bill inclusive.

Genus *Tantalus*, Linn.

187. *Tantalus leucocephalus*, Lath., Ind. Orn. 2. 706. *Le Tantale de Ceylon*, Cuv., Règne Anim. 1. 481. *White-headed Ibis.*

Irides yellow. Length, inclusive of tail, 40½ to 43 inches: tail 6½ inches.

A large diaphanous spot on each side of the base of the upper mandible before the eyes does not appear to have been noticed in the description of the bird.

The generic characters, if this bird be made the type, require modification. The stomachs of three birds were distended with fibrous vegetable matters in a commi-

nuted state. A fourth had the same vegetable matters and the half of a carp nine inches long.

Genus *Ibis*, La Cép. *Ibis.*

188. *Ibis religiosa*, Cuv., Règne Anim. 1. 483. *Sacred Ibis.* *L'Ibis sacre*, Cuv., Recherches sur les Ossemens Fossiles, 1. 161. *Tantalus Æthiopicus.* *Ibis Macei*, Cuv., Ann. Mus. 11. 125. *White Ibis with purple black secondary quill decomposed feathers*, Ind. Orn. 2. 706.

Col Sykes carefully compared the descriptions and measurements of the larger *Mummy Ibis* of Cuvier; and is induced to believe the present bird is the same. Col. Sykes puts into juxta-position the measurements of Cuvier's *Mummy Ibis* from Thebes and one of his own birds:

	Mummy Ibis. Inches.	*Dukhun Ibis.* Inches.
Length of beak and head together	8·27	8·15
Head	1·85	1·80
Tibia	5.90	5·80
Tarsus	4·01	3·80
Middle toe	3·81	3·50
Ulna	6·01	5·95
Hand	4·92	4·80

The individual of which the measurements are given has the two first quills tipped with violet, their shafts of the same colour, and four of the secondary quills are also violet, and with their webs decomposed, according with Cuvier's description. The violet colour is not so deep as in the *Æthiopian Ibis*; but as in all Col. Sykes's specimens (nine in number) the violet feathers are in progress of development, the colour would no doubt subsequently be darker. Cuvier mentions that the *Mummy Ibis* varied a little in size. Col. S. has birds larger and smaller than that of which the measurements are given.

Appear in Dukhun in the cold weather only. Gregarious.

Irides narrow, lake colour. Food water-crickets, crabs, beetles, shrimps. Length, inclusive of tail, 30 to 35½ inches: tail 5.3 to 5.7. Bill and head to occiput 7.8 to 9.6 inches. Bill to the gape 6.4 to 7.8 inches.

189. *Ibis ignea.* *Tantalus igneus*, Lath., Ind. Orn., 2. 708. 12. *Ibis falcinellus.* Temm., Man. d'Orn., 2nd Edit. 2. 569.

Col. Sykes's birds, male and female, are identical with two European specimens, in the British Museum labelled *Ibis ignea*, and viewed as the immature birds of *Ibis falcinellus*. Col. Sykes however has seen so many of both in India, appearing in different flocks at the same period of the year, and not having, as M. Temminck describes the birds before they are three years old, "partie inferieure du cou, poitrine, ventre, et cuisses d'un noir cendré; haut du dos et scapulaires d'un cendré brun," but of a rich fuscous brown, with brilliant metallic reflections; differing also in the proportions of the internal organization; and Dr. Latham moreover describes even the youngest birds of *Ibis falcinellus* as characterised by reddish brown. Herodotus speaks of the *smaller Ibis* as entirely black, a description inapplicable to the *Ibis falcinellus*, but applicable to the present species, which at a short distance appears entirely black. Col. Sykes is therefore induced to adopt the opinion of those writers who considered the bird distinct from *Ibis falcinellus*. Its measurements correspond with those of the smaller species of *Mummy Ibis* given by Cuvier; and it agrees in plumage (intense blackish brown with metallic reflections, without any mention of chestnut or marone, the livery of the *Ibis ignea*), with the descriptions of the ancients; it is therefore very probable, as M. Temminck suggests, that it is the sacred species worshipped and embalmed by the Egyptians.

Length (male), inclusive of tail, 25½ inches: tail 4¼ inches. Female 23½ inches: tail 4 inches.

Black beetles, *larvæ* of water insects, and numerous univalve shells found in the stomachs of these birds.

190. *Ibis papillosa*, Temm., Pl. Col. 304. *Black screaming Ibis.* *Indian variety of Bald Ibis*, Lath., 9. 156.

Soar high in the air in circles, uttering melancholy screams. Monogamous. Found in the stomach of several birds aquatic insects, multitudes of black beetles, *Jowaree* seeds, *Gryllotalpæ*, and vegetable matters. Col. Sykes's birds are much less brilliant in plumage than the specimen described and figured by M. Temminck.

Irides pale red. Length, inclusive of tail, 25 to 28½ inches: tail 7½ inches.

191. *Ibis falcinellus*, Temm., Man. d'Orn. 2nd Edit. 2. 599. *Tantalus falcinellus*, Linn., 1. 241. Gmel., 1. 648. *Le Courlis verd*, Buff., Ois. 8. 29. *Courly d'Italie*, Buff., Pl. Enl. 819. *Marone Ibis.*

Sexes do not differ in plumage; but the female is somewhat smaller than the male.

Length, inclusive of tail, 26 to 26½ inches: tail 4¾ inches. Multitudes of black beetles and grasshoppers, and univalve freshwater shells, found in the stomach. An *immature* bird in possession of the Zoological Society, unlike the supposed immature bird *(Ibis ignea)*, is characterized by the marone livery of the *Ibis falcinellus*.

Fam. *Scolopacidæ*, Vigors.—Genus *Totanus*, Bechst. *Sandpiper.*

192. *Totanus ochropus*, Temm., Man. d'Orn. 420. *Tringa ochropus*, Linn., 1. 250. *Green Sandpiper.*

Absolutely identical in plumage with a specimen from Hudson's Bay in the British Museum, and with English specimens.

Irides fuscous brown. Length, inclusive of tail, 9¾ to 10 inches: tail 2¾ inches.

For the most part solitary. The stomach approximates to a gizzard. Sexes alike. Cry, *Cheet, Cheet, Cheet.*

193. *Totanus Glareola*, Temm., Man. d'Orn. 2nd Edit. 2. 654. *Tringa Glareola*, Linn., 1. 250. *Wood Sandpiper.*

Differs from one specimen of *Tringa Glareola* in the British Museum in a defined white line over the eyes to the bill, more white on the throat and less brown speckled on the breast, and slightly longer hill; but is identical in plumage with another specimen.

Irides fuscous brown. Length, inclusive of tail, 9 to 9¾ inches: tail 2.2 inches. Sexes alike. In April as delicate eating as the *common Snipe.* Cry, *Chit, Chit, Chit;* but the alarm cry is like the grating of a rusty hinge.

194. *Totanus hypoleucos*, Temm., Man. d'Orn. 424. *Tringa hypoleucos*, Linn., 1. 250. *Common Sandpiper. Tringa Guinetta*, Brit. Mus. *La petit Alouette de Mer*, Buff., Pl. Enl. 850.

Irides fuscous brown. Length, inclusive of tail, 8¾ to 9 inches: tail 2.4 inches.

Cry, a sharp whistle like *Wheet, Wheet, Wheet.* Jerk the tail in a curious manner. Sexes alike. Generally solitary.

Genus *Limosa*, Briss. *Godwit.*

195. *Limosa Glottoides. Totanus Glottoides*, Gould's Century of Himalayan Birds.

Col. Sykes agrees with Mr. Gould in the propriety of separating this bird from the *Totanus Glottis (Scolopax Glottis)*, or *Green-shanks* of Europe.

Irides fuscous red brown. Length, inclusive of tail, 14 to 14½ inches: tail 3 inches.

Sexes do not differ in plumage or size. Cry in flight, a sharp, shrill *Queek, Queek.* Very wary birds. Commonly seen alone; rarely three or four together. Minute fish, *larvæ* of water insects, and univalve shells found in the stomach.

196. Limosa Horsfieldii. *Lim. suprà brunnea, plumarum rhachibus lineisque transversis angulatis nigris; mento, corpore infrà, uropygio, dorsi dimidio, caudâ, marginibusque plumarum superiorum albis; remigibus fuscis rhachibus albis; caudâ lineis plurimis angulatis angustis nigris notatâ.*

Irides intensè rufo-brunneæ. *Rostrum pedes*que (hi gracillimi) nigri. Longitudo *corporis* 8—8¾ unc., *caudæ* 2½.

This is a miniature likeness of the preceding, but quite distinct, although similar in habits, manners, flight, and cry; but with a permanent difference in size and some markings. It is comparatively a rare bird. Col. Sykes had at first considered it a young bird of *Tot. Glottoides*, until an observation of some years convinced him of his mistake. So wary as to be rarely within reach of the gun. Female with the spots and markings fainter than in the male. Bill 1.9 inch long.

Genus *Gallinago*, Ray. *Snipe.*

179. *Gallinago media*, Ray. *Scolopax Gallinago*, Linn., 1. 244. *Becassine*, Buff. Ois. 7. 483. Pl. Enl. 883.

Appears only from November until March in Dukhun. Same as the European bird, with trifling exceptions, resulting probably from age. *Irides* intense brown. Size of *common Snipe.* Found in the stomach, vegetable matter, minute univalve shells, earth-worms, *larvæ* of water insects, and fine gravel. Sexes alike.

198. *Gallinago minima*, Ray, Syn. 105. A. *Scolopax Gallinula*, Linn., 1. 244. 8. *Becassine sourde*, Temm., Man. d'Orn. 440. *Jack Snipe.*

Appears and disappears with the preceding species. Identical with the European bird and precisely similar in its habits. *Irides* intense brown. Length, inclusive of tail, 8.2 inches: tail 2.3 inches. Food the same as that of the *common Snipe.* Sexes alike.

Genus *Rhynchæa*, Cuv.

199. *Rhynchæa picta*, Gray, Proc. Zool. Soc. *Rhynch. Capensis*, Steph., 12. 65. *Scolopax Capensis*, Linn., 1. 246.

Col. Sykes has specimens in such states of plumage as to correspond with the above species, shot on the same ground. Migratory. *Irides* red brown. Length, inclusive of tail, 10 inches: tail 1¾ inches. Sexes alike. Feed like *Snipes*.

Genus *Pelidna*, Cuv. *Dunlin.*

200. *Pelidna Temminckii*, Steph., 12. 103. *Tringa Temminckii*, Leisl. Temm., Man. d'Orn. 401. *Small Dunlin.*

Identical with the European bird. *Irides* dark brown. Length, inclusive of tail, 6 to 6½ inches: tail 2 inches. Feed like *Snipes*. Gregarious. Excellent eating.

Fam. *Rallidæ*, Leach.—Genus *Parra*, Linn. *Jacana.*

201. *Parra Sinensis*, Gmel., 1. 709. *Yellow back-necked Jacana.* Fig. in Gould's Century of Birds.

The immature bird is the *Parra Luzoniensis*. Dive remarkably well despite their long toes. *Irides* fuscous brown. Length, inclusive of tail, 18 to 19 inches: tail 9 to 10 inches. Found in the stomach of many birds vegetable matter, two species of univalve shells, bugs *(Cimex annulatus)*, and fine gravel. Gregarious, and common on the rivers in Dukhun.

Genus *Gallinula*, Ray. *Gallinule.*

202. *Gallinula Javanica*, Horsf., Linn. Trans. 13. 196. *Poule Sultane de la Chine*, ou *Poule Soultane brune*, Pl. Enl. 896. *Pan Komree* of the Mahrattas.

This is the Variety β of the 'Index Ornithologicus.' Dr. Horsfield has judiciously separated it from the *Gall. phœnicura*. Col. Sykes's specimens differ from Dr. Horsfield's only in being a little larger. *Irides* fuscous red. Length, inclusive of tail, 11½ to 12½ inches: tail 2¾ to 3 inches. *Larvæ* of water insects found in the stomach. Legs very long.

Genus *Rallus*, Auct. *Rail.*

203. Rallus Akool. *Rall. corpore suprà lateribusque olivaceo-fusco-brunneis; alis caudâque fuscis; gutture, pectore, ventre, uropygioque cinereo-brunneis; tegminibus alarum caudæque inferioribus saturatè brunneis; mento albo.*
Rostrum virescenti-nigrum. *Pedes* carneo-brunnei. Longitudo *corporis* 8—9 unc., *caudæ* 2½.

The only spot of white on the bird is at the chin. Wings and tail short. This bird appears quite distinct from any described species of *Rallus* or *Gallinula*. The nearest approach to it is the *Rall. niger* of Gmelin from the Cape of Good Hope. Sexes alike. Frequents sedgy and marshy places amidst low bushes. Shuns observation.

Genus *Porphyrio*, Briss.

204. *Porphyrio smaragnotus*, Temm., Man. d'Orn. 2nd Edit. 2. 700. *Fulica Porphyrio*, Linn., 1. 258. *Le Talève de Madagascar*, Buff., Pl. Enl. 810.

These very beautiful birds are found on most of the very large tanks or ponds, the surface of which is a good deal covered with the broad leaves of the *Lotus*, on which the birds walk. Vegetable matters only found in the stomach of several birds, particularly parts of the green capsules of *Trapa bispinosa*. Sexes alike. *Irides* blood red. Length, inclusive of tail, 18 inches: tail 3¾ inches. Stomach a true gizzard.

Genus *Fulica*, Auct. *Coot.*

205. *Fulica atra*, Linn., 1. 257. *Le Foulque*, Buff., Ois. 8. 211. Pl. Enl. 197.

Differs only from Javanese specimens in being larger, and a shade lighter below. Much larger than the *common Coot* of Europe, but with the same coloured *irides* (crimson), and does not otherwise differ. Length, inclusive of tail, 18 to 19 inches: tail 2 inches. It has the habits of *Podiceps*, and with the gizzards, long *cæca*, and general internal organization of a *Duck*, seems to belong to the order *Natatores*. Water weeds and coarse sand found in the stomach.

Fam. *Charadriadæ*, Leach.—Genus *Cursorius*, Lath. *Courser.*

206. *Cursorius Asiaticus*, Lath., Ind. Orn. 2. 751. 2. *Cour-vite de Corromandel*, Buff., Ois. 8. 129. Pl. Enl. 892.

Irides dark brown. Length, inclusive of tail, 10 inches: tail 2¾ inches. Sexes alike. Numerous in Dukhun; but only on the open stony and grass plains. This bird has the shortness of intestine of the *Bustard* (equal to the length of the body), with a stomach nearly similar; feeding in the same manner on insects and their *larvæ* and with the same cursorial habits, and should therefore be placed near the *Struthionidæ*, after *Otis* and *Tetrao*.

Genus *Vanellus*, Briss. *Lapwing.*

207. *Vanellus Goensis*, Steph., 11. 514. *Tringa Goensis*, Lath., Ind. Orn. 2. 727. 7. *Para Goensis*, Gmel., 1. 706. *Vanneau armé de Goa*, Buff., Pl. Enl. 807.

Irides fuscous crimson. Length, inclusive of tail, 14 inches: tail 5 inches. Affect open plains and beds of rivers. Gregarious. Water insects, shells, and corn found in the stomach. A watchful and noisy bird at night: uttering cries of *Did he doo it, Did he doo it.* Sexes alike.

208. *Vanellus bilobus. Charadrius bilobus*, Gmel. 1. 691. *Le Pluvier de la côte de Malabar*, Buff., Pl. Enl. 880.

The bird has a black bill, yellowish at the base; and not a yellow bill, as described in the 'Index Ornithologicus.' There are one or two other minor discrepancies; but no doubt it is the species figured by Buffon. Although it wants the hind toe, and is therefore, agreeably to generic characters, a *Charadrius*, its habits, figure, food, and almost its cry, are those of the preceding species. Col. Sykes has therefore classed it as a *Vanellus*. *Irides* yellowish. Length inclusive of tail, 11¾ to 12 inches: tail 3¾ inches. Gregarious. Found only on the open stony and grass plains. Like the *Van. Goensis*, a restless noisy bird at night, crying *Deewit*, *Deewit*. Sexes alike.

Genus *Charadrius*, Auct. *Plover.*

209. *Charadrius pluvialis*, Linn., 1. 254. 7. *Le Pluvier doré*, Buff., Ois. 8. 81. Pl. Enl. 904. *Golden Plover.*

Identical with Javanese specimens. Smaller than one North American specimen and two English specimens in the British Museum; but absolutely identical with other British specimens. A rare bird in Dukhun, and appearing only in the cold weather. *Irides* almost black. Length, inclusive of tail, 10 inches: tail 2.6 inches. Gregarious. In the stomach were found beetles, land insects, and coarse sand.

210. *Charadrius Philippensis*, Lath., Ind. Orn. 2. 745. 11. *Petit Pluvier à collier de Luçon*, Sonn., Voy. Ind. 84. pl. 46.

This little bird has the habits of *Totanus;* frequents the shores of fresh water only; and in firing into a flock of *Sandpipers* it is frequently killed in company with them. *Irides* fuscous crimson. Length, inclusive of tail, 7¼ inches; tail 2.3 inches. Gregarious. Sexes alike. Sonnerat, in his description, omits to mention that the margins of the eyelids are bright yellow; instead of which he calls the *irides* yellow.

Genus *Himantopus*, Ray. *Longshanks.*

211. *Himantopus melanopterus*, Horsf., Linn. Trans. 13. 194. *Charadrius Himantopus*, Linn., 1. 255. *L'Echasse*, Buff., Ois. 8. 114. Pl. Enl. 878.

There are slight discrepancies in the plumage between the birds of Java, India, and Europe; and in case of these being permanent, and not the result of nonage, specific differences might be established. *Irides* narrow, lake or crimson colour. Length, inclusive of tail, 16 inches; tail 3½ inches; to the end of the toes 22¾ inches. Gregarious. Vegetable matters, *larvæ* of water insects, and minute univalve shells found in the stomach. These birds are strangely polluted with visceral worms of the tape and capillary kinds.

Genus *Œdicnemus*, Cuv. *Thick-knee.*

212. *Œdicnemus crepitans*, Temm., Man. 322. *Otis Œdicnemus*, Lath., Ind. Orn. 2. 661. 11. *Charadrius Œdicnemus*, Linn., 1. 255. *Le grand Pluvier*, Buff., Pl. Enl. 919. *Great-headed Thick-knee.*

There is no visible difference between the Dukhun and British species. Eyes of very great size. *Irides* very broad, of a greenish yellow. Length, inclusive of tail, 17 to 18 inches; tail 4¾ inches. Gregarious. Frequents bushy wilds as well as grass plains. Not met with in woods. Land insects and seeds found in the stomach. Sexes do not differ in size or plumage. This bird rests on the first joint of the leg like the *Gallus giganteus.*

Order V. NATATORES, *Ill.*

Fam. *Anatidæ*, Leach.—Genus *Plectropterus*, Leach.

213. *Plectropterus melanotos*, Steph., 12. 8. *Anas melanotos*, Gmel. 1. 503. *L'Oie bronzée de Coromandel*, Buff., Pl. Enl. 937. *Black and white Plectropterus. Nukta* of the Mahrattas.

The very large vertical compressed process on the upper mandible; the white lower part of the back; cinereous rump; and rudimentary black mane down the back neck are not noticed in descriptions of this species. This noble and splendid bird is not common in the Dukhun. Female considerably less in size than the male, and with the metallic reflections much less brilliant; destitute also of the comb or crest on the upper mandible. Seen in pairs. Horny process on the bend of the wing obtuse. Length, inclusive of tail, 30 to 34 inches; tail 5½ to 6 inches. Seeds of water-grasses, and the remarkable quadrangular hard seeds met with in the stomach of the *Pterocles exustus* found also in the stomach of the *Plectropterus*. Digastric muscle of the remarkable thickness of 1.2 inch.

Genus *Anser*, Briss.

214. *Anser Girra. Anas Girra*, Gray, Indian Zool. Illust. No. 4. fig. 6. *Girra Teal*, Lath. *Cotton Teal* of Europeans in Dukhun, from the quantity of white in the plumage.

Irides bright crimson.

This handsome bird is one of the smallest of the *Anatidæ*. Length, inclusive of

tail, 12½ to 14 inches; tail 3 to 3¼ inches. Sexes exactly alike. Monogamous. Vegetable matter and gravel found in the stomach. These birds, when wounded, dive, and on returning to the surface show only the bill above water, keeping the body below at pleasure.

Genus *Tadorna*, Leach.

215. *Tadorna rutila*, Steph., 12. 71. *Anas Cusurca*, Linn., App. 3. 224. *Shieldrake. Bruhmuny Duck* of Europeans in Dukhun.

Irides yellowish brown. Length, inclusive of tail, male 28 inches, female 25 to 26 inches; tail 5½ inches. For the most part of the year these birds are in pairs, but on the Nerbudda river in Guzerat, Colonel Sykes has seen them congregated in hundreds in April. Found in the stomachs of many birds, grass seeds and vegetable matters only. The female is destitute of the black ring round the neck ornamenting the male. The intestinal canal twice the proportional length of that of the *Plectropterus*.

Genus *Anas*, Auct.

216. *Anas strepera*, Linn., 1. 200. *Chipeau*, Buff., Pl. Enl. 958. *Chestnut lesser wing-covert Duck.*

Males identical with specimens in the British Museum from Kent. No females for comparison. Length, inclusive of tail, male 24 to 25 inches, female 22 inches; tail 4 inches. Numerous in Dukhun. Gregarious. A tape-worm was found protruding through the coat of the intestine in one bird, without affecting its health or flesh.

Genus *Rhynchaspis*, Leach, MSS.

217. *Rhynchaspis virescens*, Leach, MSS. *Anas clypeata*, Linn., 1. 200. *Souchet*, Buff., Ois. 9. 191. Pl. Enl. 971. 972. *Black-headed shoveler.*

Identical with British specimens of the *common Shoveler;* but differing from the description of that bird in Shaw. *Irides* yellowish brown. Length, inclusive of tail, 20 to 21 inches; tail 4 inches. Grass seeds, vegetable matters, pulse-like seeds, and gravel found in the stomach. Gregarious. The intestinal canal is more than seven times as long as the body, neck and bill included; and in this particular is not approached within nearly two-sevenths by any other bird of the order *Natatores*.

Genus *Mareca*, Steph. *Wigeon.*

218. *Mareca pœcilorhyncha*, Steph., 12. 134. *Anas pœcilorhyncha*, Gmel., 1. 535. *Spotted-billed Duck*, Lath.

Irides red fuscous brown. Length, inclusive of tail, 22 to 25 inches; tail 4 to 4½ inches. Sexes alike in plumage. Grass seeds, vegetable matters, and small stones found in the gizzard. Colonel Sykes's birds identical with a specimen in the British Museum, from the Himalayan mountains. The spot at the end of the bill invariably yellow, but in books it is stated to be white. The digastric muscle thicker than the diameter of the cavity of the gizzard. Colonel Sykes does not consider this species a true *Marcca*.

219 *Mareca fistularis*, Steph., 12. 131. *Anas Penelope*, Linn., 1. 202. *Canard Siffleur*, Buff., Ois. 9, 169. Pl. Enl. 825. *Wigeon.*

Irides red fuscous brown. Length, inclusive of tail, 19 to 20 inches (male), 18½ to 19 inches (females); tail 3½ to 3¾ inches. Gregarious. Absolutely identical with specimens from Devonshire. Contents of the gizzard as in the preceding species.

220. Mareca Awsuree. *Mar. nigrescenti-brunnea; plumarum scapularium dorsique apicibus flavescenti-brunneis; tegminibus alarum minoribus caudæque superioribus saturatè castaneis; vertice lineâque cervicali fuscis; capite, collo, pectoreque pallide flavescenti-brunneis, ventre uropygioque saturatioribus ferrugineis; mento tegminibusque caudæ inferioribus sordidè albis.*

*Rostrum pedes*que nigri. Longitudo (caudâ inclusâ) 18½—20 unc., *caudæ* 2½. *Whistling Teal.*

This bird, of which Colonel Sykes has many specimens, is identical with a bird in the British Museum, from Africa; one in the Zoological Society, from Bengal; and one in the India House, from Java. In the whole of these, the lunules on the breast, neck, and upper part of the back, and the strong black short mane of the *Anas arcuata* are wanting. It is also larger than that bird, and Colonel Sykes is therefore led to believe this to be a distinct species, although strongly resembling it.

Gregarious, and abundant in Dukhun. Sexes alike in plumage. These birds are characterized by a very peculiar whistle when disturbed, by a proportionate length of intestine one-third shorter than that of any other species of the *Anatidæ*, and by the inferior *larynx* being dilated into two oblong chambers, placed rather in front of, than lateral to the *trachea*.

Genus *Querquedula*, Ray. *Teal.*

221. *Querquedula Circia*, Steph., 12. 143. *Anas Circia*, Linn., 1. 204. *Sarcelle d'été*, Buff., Ois. 9. 268. Pl. Enl. 946. *Gargany Teal.*

Length, inclusive of tail, 16½ to 17½ inches ; tail 3 to 3.4 inches. Female the smaller bird, and quite dissimilar in plumage. Identical with British specimens. Gregarious. In addition to similar contents of the gizzards in other species, rice in the husk was found.

222. *Querquedula Crecca*, Steph., 12. 146. *Anas Crecca*, Linn., 1. 204. *Petite Sarcelle*, Buff., Ois. 9. 265. Pl. Enl. 947. *Common Teal.*

Identical with male and female British specimens. Length, inclusive of tail, 15½ to 16 inches ; tail 3 inches. Water-weed and gravel in the stomach. Colonel Sykes has in his possession specimens (male and female) resembling the female of *Querq. Crecca ;* but in which the proportional length of the intestinal canal differs so much from that of *Querq. Crecca* (3·30 to 1, and 5·57 to 1), that he is induced to believe they may belong to a distinct species. It will be observed that the proportional length of the intestine (5·57 to 1) closely approximates to that of a widely-different bird, the carrion-devouring *Percnopterus.*

Genus *Fuligula*, Steph. *Pochard.*

223. *Fuligula rufina*, Steph., 12. 188. *Anas rufina*, Pall. *Le Canard Siffleur huppé*, Buff., Ois. 9. 282. Pl. Enl. 928. *Red-headed Pochard.*

Length, inclusive of tail, 25 inches ; tail 3½ inches. Digastric muscle remarkably thick. Rare in Dukhun. Vegetable matters and gravel in the stomach.

224. *Fuligula* ———. *Ash-brown Pochard with white speculum.*

This bird has a considerable resemblance to the female of *Ful. rufina*, as described by Mr. Stephens, but it has a black bill ; and Colonel Sykes is not able to meet with a specimen to institute a rigid comparison ; he therefore leaves the bird for future consideration. Length, inclusive of tail, 24 iuches ; tail 3½ inches. A coloured figure in Hunt's British Ornithology (Norwich) represents the female of *Ful. rufina* with a red bill, red legs, and reddish-brown plumage, which militate against its identity with the present bird.

225. *Fuligula cristata*, Steph., 12. 190. *Anas Fuligula*, Linn., 1. 207. *Morillon*, Buff., Ois. 9. 227. Pl. Enl. 1001. *Tufted Duck.*

Differs only in the more pronounced amethyst reflection of the back neck in the male from British specimens. Female identical. *Irides* bright yellow. Length, inclusive of tail, 18 to 19 inches ; tail 2.5 to 2.7 inches. Female the smaller bird.

Fam. *Colymbidæ*, Leach.—Genus *Podiceps*, Lath.

226. *Podiceps Philippensis*, Steph., 13. 16. *Indian Grebe*, Lath., 10. 29. described from drawings of Sir John Anstruther. *Le Castagneux des Philippines*, Buff., Ois. 8. 246. Pl. Enl. 945. Buffon's plate is excellent.

Irides broad, of an ochry yellow ; they dilate and contract. Length, from the bill to the rump, 9½ to 9¾ inches ; tail none. Common in Dukhun, where their unceasing habit of diving occasions their being called *Divers* by Europeans, although quite distinct from the genus *Colymbus*. From their remarkable quickness of eye, Colonel Sykes has known a dozen unsuccessful shots fired at the same individual, which constantly disappeared under water ere the shot reached him. Gregarious. Stomach simple, resembling that of *Herons*, and wholly unlike that of *Ducks*. Found in the stomach *larvæ* of water insects and shrimps, aliments common to the *Heron* tribe, aud not found by Colonel Sykes in the gizzard of *Ducks*.

Fam. *Pelecanidæ*, Leach. Genus *Phalacrocorax*, Briss. *Cormorant.*

227. *Phalacrocorax Javanicus*, Steph., 13. 90. *Carbo Javanica*, Horsf. Linn. Trans. 13. 197. Figured in Illust. Ind. Zool., part 10. fig. 9. *Shag* of Europeans in Dukhun.

Absolutely identical with Dr. Horsfield's specimens from Java. Differs from *Pelecanus Africanus (Phal. Africanus)*, with which it has been confounded, in the scapulars and wing coverts being reddish-fuscous-brown instead of blue-gray, and being margined and tipped with lighter brown instead of black ; in the first three quill-feathers being black iustead of pale brown ; iu the secondaries not beiug so long as the quills ; tail graduated instead of cuneiform ; in the front of the neck being reddish and fuscous instead of black and white ; finally, in the belly being rusty black instead of white varied with dusky. There can be no question, therefore, of the propriety of its being cousidered a distinct species by Dr. Horsfield. Colonel Sykes has seen hundreds of them, and notes these differences with several specimens lying before him. *Irides* remarkably narrow, crimson. Length, inclusive of tail, 22 to 23 inches ; tail 6 inches. Sexes alike. The only spot of white on the bird is at the chin. Very numerous in Dukhun, appearing in the rivers in flocks of hundreds. Fish (some 3 inches long) and prawns found in the stomach of many birds ; also capillary worms. Colonel Sykes remarks, that the generic character, " Face and throat naked" is inapplicable to this species.

Genus *Plotus*, Linn. *Darter.*

228. *Plotus melanogaster*, Gmel. 1. 580. *Anhinga noir du Senegal*, Buff., Ois. 8. 453. Pl. Enl. 960 & 107. *Black-billed Darter*, called the *Snake-bird* in Dukhun.

Irides bright yellow. Length, inclusive of tail 37½ inches; tail 9½ inches. Solitary. Rare in Dukhun, but frequently met with below the Ghauts. This bird has the singular faculty of being enabled to swim with the whole of its body under water, the long neck and head alone being visible, looking like a snake. Colonel Sykes' limits do not permit him to enlarge on the very peculiar formation of the stomach, more resembling that of a ruminant than a bird. Seven small carp and much deep-green vegetable fibre were found in the stomach of a female.

Fam. *Laridæ*, Leach.—Genus *Sterna*, Linn. *Tern.*

229. *Sterna acuticauda*, Gray, Illust. Ind. Zool., part 6. fig. 3. *Small yellow-billed Tern. Sterna melanogaster*, Temm., Pl. Col. 434?

Irides reddish deep brown. Length, inclusive of tail, 13½ to 14½ inches; tail 6¾ to 7 inches, very forked and acute; the lateral feathers being subulate. Fish found in the stomach. Although the wings are so long, the flight is slow and with a good deal of flapping. Take their prey while on the wing by darting obliquely upon it. Do not dip under water, nor dart perpendicularly, like *Alcedo rudis*. This elegant and slender species Colonel Sykes shot 160 miles inland, and at an elevation of 1800 feet above the sea. Gregarious. Common in Dukhun.

230. *Sterna similis*, Gray, Illust. Ind. Zool., part 6. plate 8. fig. 2. *Tern, with a fuscous lake-coloured bill.*

Length, inclusive of tail, 11½ to 12 inches; tail 3.3 to 3.5 inches; slightly forked, and without the lateral, elongated, and subulate feathers of *Sterna acuticauda*. Fish only found in the stomach. Gregarious. Habits and locality of the last species. Colonel Sykes states it as curious, that all his specimens, seven in number, of *Sterna acuticauda* and *Sterna similis* proved to be females. Common in Dukhun.

231. Sterna Seena. *Sterna suprà cinerea: fronte, vertice, cervicequesaturatè nitidè atris; corpore infrà albo, hypochondriis parùm cinereo tinctis; rectricibus lateralibus albis.*

Irides saturate rufescenti-brunneæ. *Rostrum* forte, flavum. *Pedes* rubri. Longitudo (caudâ inclusâ) 17—17½ unc., *caudæ* 8—8½, *rictûs* 2.5.

This species differs from *Sterna affinis* of Ruppell, tab. 14. p. 23, in its smaller size, and having red instead of black legs; in the white not being so brilliant, and in a stronger bill. Ruppell's *Sterna velox* appears to correspond in size with it. In the numerous species in the British Museum there is not one with which it can be identified. Proportionably to the shortness of the legs the claws are long, much arched, slender and sharp, and turn outwards. Hind claw never touches the ground. Same locality and habits as the preceding species, although rare in Dukhun. In the stomach and *œsophagus* of one bird were found the extraordinary number of thirteen *Cyprini*, one of them 2½ inches long. Tail very much forked; lateral tail-feathers subulate, white, 8 inches long. Wings very narrow and long, reaching nearly to the end of the tail.

Genus *Viralva*, Leach.

232. *Viralva Anglica*, Steph., 13. 174. *Sterna Anglica*, Mont., Orn. Dict. *Sterna aranea*, Wils., Amer. Orn. 8. 143. pl. 72. fig. 6? *Marsh Tern*, Lath. *Gull-billed Viralve.*

Colonel Sykes' specimens correspond exactly with specimens of this rare British bird in the British Museum, both in their winter and summer plumage. *Irides* deep red brown. Length, inclusive of tail, 14½ to 16½ inches; tail 4½ to 5¾ inches. Sexes alike in plumage, but the female somewhat smaller than the male. Numerous fish found in the stomach of many birds. With the aspect, length of wing, lazy flights and habits of the *Tern*, this bird has a bill approximating to that of the *Gull*, not quite identical with the bill of the *Viralve.*

Colonel Sykes states, that the *domestic Duck (Anas Boschas)* is exteusively bred by the Portuguese in the Western India, and that it is subject to a kind of apoplexy, which carries it off in a few minutes, although previously in apparent health. He has known a trader lose a flock of more than thirty in the course of one day; and he has himself had ten ducks struck simultaneously, stagger about for a short time as if drunk, run round in circles, fall on their backs, and die. He has not been able to discover any morbid appearances in the brain. In no instance, in the stomachs of the *Anatidæ*, were animal matters met with; the contents consisted of grains, seeds, vegetables, and gravel.

Colonel Sykes, in closing his Catalogue of the birds of Dukhun, mentioned that the details he had given resulted from personal observation of the specimens, in a living or recent state. With few exceptions, the whole were shot by himself; and to guard against false impressions, he accumulated several individuals of the same species and of both sexes, and was rarely confined to a solitary bird.

X.—*Miscellaneous.*

I.—*Climate of the Neelgherries (Nilgiris, or Blue Mountains), on the Malabar Coast.*

We have drawn the following abstract from the *Daily Atmospherical Register*, published in Dr. Baikie's recent work—"on the Topography, Climate, Soil, and Productions" of these hills, a work embodying every possible information regarding this new resort of invalids, and embellished, in the most profuse manner, with maps, coloured drawings, and botanical plates*. As the volume itself will be in the hands of most of our readers, we do not think it necessary to make any further extracts than such as illustrate the meteorological table, but we recommend the author's "hints to invalids" to the perusal of such as feel inclined to visit Ootacamund. Captain Harkness's observations on the inhabitants of the Nilgiris, and a valuable list of plants by the Rev. Mr. Schmid, are added in an Appendix.

Pressure.—"The range of the barometer on the hills appears to be considerably greater than in the same latitude at the level of the sea. I have no access to any accurate account of the range on the Malabar Coast, opposite to the hills, but I believe it does not exceed 0.250 of an inch. Now, on an inspection of the annexed meteorological tables, it will be seen, that in January, 1832, the barometer attained the height of 23.375, the maximum of its elevation since my observations began; while in the month of September previous, it had fallen as low as 22.675, (corrected to 32° Fahrt.,) shewing an extreme range of 0.700. This range appears however to differ annually; being for three years as follows:

"For 1831, it was 0.560.
" 1832, 0.539.
" 1833, 0.388, giving a mean annual range of 0,495.

"As might have been anticipated, the barometer appears to attain its maximum height in the cold dry weather of January or February, and its minimum during or immediately after the S. W. monsoons. It generally begins to sink gradually about the beginning of April, and continues descending (but with occasional starts) till August or September, when it again rises gradually till the cold weather sets in. But here (as is found to be the case elsewhere within the tropics) I have not been able to satisfy myself that any accurate prognostication of the state of the weather is to be deduced from the fluctuations of the mercurial column. I have seen it rise suddenly before or during heavy showers of rain, and sink, equally inexplicably, before a course of fine dry weather. The only agent which appears uniformly to act in the same way upon it is wind, the mercury always rising before or during the prevalence of high wind. I have also occasionally been able to predict wet weather, from observing the top of the column to be flattened, or concave, but not with any degree of certainty.

"The daily range of the barometer is very trifling, probably never exceeding 0.040 or .060 of an inch, and seldom greater than .035; but on this head, as on that of its horary oscillations, I am unable to speak confidently, from want of leisure to make the necessary observations; the horary oscillations occur, as far as I have observed, exactly at the same hours, and in the same succession, as elsewhere all over the globe; but according to Dr. Dalmahoy, only to half the extent observed at Madras, and they are not interrupted during the monsoon, as conjectured by Baron Humboldt.

* The work is published at the Calcutta Baptist Mission Press; the plates and maps by Tassin. Mr. Smoult, the Editor, gives, in the preface, a statement of the cost of publication, amounting to Sa. Rs. 3494, for the plates, and Rs. 758. 4. 0. for the letter-press. The subscription list contains nearly 300 names.

"The mean annual height of the barometer appears to vary considerably, and to have diminished annually for the last three years: this may have depended on the situation of the instrument*.

"The mean of ten months: in 1831, was 22.932,
six ditto, in 1832, ,, 23.067,
eight ditto, in 1833, ,, 23.054, giving as an annual mean for 24 months in three years, 23.018. This is probably near the truth, and Dr. Dalmahoy, in his calculations to determine the height of Ootacamund above the level of the sea, assumes it to be 23.005."

Temperature.—"According to theoretical calculation, the mean temperature of Ootacamund should be 52°.28.

"There is some discrepancy of opinion as to the correct method of ascertaining the mean observed temperature. The author of the able article, Meteorology, in the Edinburgh Encyclopedia, after an elaborate consideration of the various proposed methods, gives the preference to the mean of the daily extremes. According to this calculation, the mean of the daily extremes for 25 months is 58°.68, which we therefore assume as the mean annual temperature of Ootacamund. The daily range for nine months of this year, which may be considered as an average season:

"January,	20·40	June,	15·59	
February,	20·33	July,	10·29	Minimum.
March,	23·33 Maximum.	August,	15·22	
April,	19·73	September,	11·73	
May,	16·48			

Giving a general mean of 17·01

"The greatest observed annual range (but in different years) appears to be 38° (viz. between 39° and 77°.)

"It is important to remark, that this range is still betwixt two points, which occur frequently in temperate climates, and is certainly less than what prevails in most of them. The maximum observed is 77°, only 2° above what is assumed as summer heat in England; and the minimum, 38°, is much above what frequently occurs even in the mildest parts of Europe.

"In stating the observed minimum at 38°, it must be recollected, that the observations were taken at a point raised above the lake, and about half way up the hill bordering the cantonment on the south.

"In the valley below, from the combined effects of radiation, evaporation, and the descent of the colder columns of air by their superior weight, which are moreover comparatively undisturbed by the wind, the temperature frequently falls below freezing point, and ice is often found in the dry seasons half an inch thick. Hoar-frost is commonly seen extending half way up the hills on every side, disappearing as the power of the sun's rays gradually increase. The difference is most evident in descending into the lower valleys on a dark clear and still

* The height of Ootacamund, found trigonometrically by Captain Ward, was 7361 feet. From the Barometrical mean, 23,054, compared with Madras, 29,810, and corrected for temperature of the mean stratum of air $\frac{81.7+57.6}{2}=69.6$, the altitude results, 7221 feet. The boiling point, noted in May, 198° Farh., gives 7574 feet, but the Thermometer was probably in error.—J. P.

night, when the sudden immersion into the column of air next the ground, cooled by its contact with the radiating earth at the bottom of the valley, strikes one with a sudden chill. As a consequence of the same cause, the lower valleys are frequently filled with a dense fog, while the stratum of air immediately above is perfectly clear and transparent.

"So powerful is this effect of radiation from the earth, that a cup of water or milk, placed on the ground, even in the higher situations, instantly freezes, while a thermometer, elevated three feet above it, will only indicate a temperature of 38°, 39°, or 40°. This fact leads to some important conclusions both as to the situation of houses, and of ground selected for horticultural or agricultural purposes. In a clear bright day, the thermometer generally attains its maximum at about 2 or ½ past 2 P. M., but this is, to the feelings, by no means the hottest part of the day, owing to the constant current of wind prevailing, from one quarter or another, at that time. About ½ past 8 or 9 A. M. is the time when the sun's rays appear to have most power, the air being then still, and its capacity for heat having been diminished by the increase of density arising from the cold of the preceeding night. This it is important for invalids to observe, as well as the sudden chill produced by the sinking of the sun below the horizon in the evening, when the column of rarefied air next the surface rises aloft, and is rapidly replaced by a colder stratum from above.

"The minimum generally occurs about half an hour before sun-rise, when as before observed, the lower valleys are generally filled with fog.

"During the monsoon season, when the sky is covered with clouds, at once diminishing the power of the sun's rays, and obstructing the effect of radiation from the ground, the temperature is remarkably equable, the range seldom exceeding 12° or 14° in the open air, while in rooms without a fire, it is under 4 or 5°. The thermometer attached to one of my barometers, kept in a small sleeping room, without a fire-place, (though the house itself was rather exposed,) during the months of May, June, July, August, and September, 1831, never fell below 59°. 5, nor rose above 62°. This is therefore, notwithstanding many drawbacks, much the most favourable season for invalids, and should be selected, when a power of choice exists, as the period for ascending the hills."

Moisture.—"The air during the month of January, February and March, is intensely dry, the point of saturation, (or temperature to which the air must be reduced to deposit any part of its moisture,) being occasionally as low as 13°, the temperature of the air being 60°. In April it begins to fluctuate, and in May, the quantity of moisture increases very perceptibly, being accompanied by rapid changes of the electrical condition of the atmosphere, indicated by thunderstorms and heavy showers, but of short duration. During June, July, and August, it is nearly charged with moisture; in September, it is again fluctuating; in October and November, moist; and in December, it begins to re-assume its dry state.

"In close connection with the above statement, we find, that there is little or no rain in the first three months, some showers in April and May, a good deal of drizzle and light rain in June, July, and August; the month of September varies, as does that of October; in November there are heavy falls, and in December the weather again becomes dry. This will be more distinctly seen in the table in which is given the fall of rain in each month during the greater part of four years, as observed by my friend Dr. Glen, of the Bombay Establishment; the mean annual fall, as deduced from this table, is 44·88 inches, or 13. 58 inches great-

er than the mean fall in England, as stated by Mr. DALTON*. The following table will probably be interesting, particularly to invalids, whose comfort depends so much on the capability of taking exercise: it presents the actual state of the weather for 366 days, from 1st March, 1831, to 29th February, 1832, which, from all I can learn, may be considered an average season:

Number of days of heavy rain,	19
Do. occasional showers with fair intervals,	81
Do. cloudy,	28
Do. clear and fine,	238
	366

Abstract of Meteorological Observations, made at Ootacamund, Lat. 11° 25′ N. Long. 76° 45′ E. on the Nilgiris, in the years 1831, 32, and 33, by Dr. Baikie.

Barometrical Altitude, 7361 feet.

	BAROMETER AT 32°.					THERMOMETER.						
Months.	Mean of Max. and min.		At 10 A. M.	Assumed mean.	Deviation from annual mean.	Mean of max. and min. Outside in Shade.			Assumed mean.	Deviation from annual mean.	Wind.	Rain.
	1831.	1832.	1833.			1831	1832	1833				
Jan.....	——	23.228	23.134	23.200	+.148	——	53.0	53.1	53.0	—4 6	E.	0
Feb.....	——	23.224	23.105	23.180	+.128	——	53.5	56.0	54.5	—3.1	N.E.	0.47
March,	23.175	23.029	23.167	23.124	+.072	58.0	58.5	62.0	59.0	+1.4	E.	1.02
April, ..	23.085	23.025	23.109	23.073	+.021	62.0	63.0	63.0	62.6	+5.0	N.E.	4.00
May, ..	22.983	22.996	23.018	22.999	—.053	60.5	64.5	61.5	62.2	+4.6	var.	6.50
June, ..	22.910	22.903	23.015	22.943	—.109	59.5	62.5	58.0	60.0	+2.4	W.	6.50
July, ..	22.861	——	22.944	22.900	—.152	58.0	55.0	58.7	57.2	—0.4	SW.	4.27
Aug. ..	22.820	——	23.045	22.920	—.132	59.0	56.5	58.7	58.1	+0.5	SW.	4.00
Sept. ..	22.785	——	22.986	22.970	—.082	56.5	57.5	59.9	58.0	+0.4	W.	6.36
Oct. ..	33.056	——	——	23.050	—.002	58.0	——	——	58.0	+0.4	var.	6.51
Nov. ..	23.070	——	——	23.080	+.028	56.0	——	——	56.0	—1.6	N.E.	3.52
Dec. ..	23.174	——	——	23.180	+.128	52.5	——	——	52.5	—5.1	N.E.	1.73
				23.052	30 0				57.6			44.88

2.—*Tibetan Grammar and Dictionary of M. Csoma de Körös.*

We have to congratulate the learned world upon the completion of M. CSOMA's labours, and the accession of a standard to the keys of oriental literature, upon which the utmost confidence may be placed by those who may hereafter seek a knowledge of the Tibetan language. The two volumes (600 pp. quarto) have been printed at the expence of Government, under the direction of the Asiatic Society, aided by the immediate superintendance of the author himself. The style of printing does great credit to the Baptist Mission Press; and although the Tibetan characters being from the old Serampur fount, are not well formed, this imperfection is removed by the copious lithographed alphabetical schemes at the end of the Grammar, where all the varieties of writing are faithfully rendered.

M. CSOMA has, perhaps wisely, withheld from his present work all disquisitions on the connection of the Tibetan with other languages, on the people, or their literature, further than to show that the latter is derived from Indian sources,

* Edinburgh Encyclopedia, Article Meteorology.

and to give a few examples for the exercise of the student. He has however enumerated in page 180, a few of the principal Tibetan authors, and he has also given a chronological table with valuable notes; and a list of the various epochs of the death of Shakya, according to Surishmati, the pupil of Padmakarpo. We cannot refrain from quoting the opening remarks of his preface.

"The wide diffusion of the Buddhistic religion in the eastern parts of Asia, having of late greatly excited the attention of European scholars, and it being now ascertained by several distinguished Orientalists, that this faith, professed by so many millions of men in different and distant countries in the East, originated in Central or Gangetic India, it is hoped, that a Grammar and Dictionary of the Tibetan language will be favourably received by the learned Public; since, Tibet being considered as the head-quarters of Buddhism in the present age, these elementary works may serve as keys to unlock the immense volumes, (faithful translations of the Sanskrit text,) which are still to be found in that country, on the manners, customs, opinions, knowledge, ignorance, superstition, hopes, and fears of great part of Asia, especially of India, in former ages.

"There are, in modern times, three predominant religious professions in the world, each counting numerous votaries, and each possessed of a large peculiar literature:—the Christians, the Muhammedans, and the Buddhists. It is not without interest to observe the coincidence of time with respect to the great exertions made by several Princes, for the literary establishment of each of these different religions, in the Latin, the Arabic, and in the Sanskrit languages, in the 8th and 9th century of the Christian Æra: by Charles the Great, and his immediate successors, in Germany and France; by the Khalifs Al-Mansur, Harun al-Rashid, and Al-mamun, at Bagdad; by the Kings of Magadha, in India; by Khrisrong de'hu tsan, Khri de'srong tsan, and Ralpachen, in Tibet; and by the Emperors of the Thaug dynasty, in China. But it is to the honour of Christianism to observe, that while learning has been continually declining among the Muhammedans and the Buddhists, Christianity has not only carried its own literature and science to a very advanced period of excellence, but in the true and liberal spirit of real knowledge, it distinguishes itself by its efforts in the present day towards acquiring an intimate acquaintance with the two rival religious systems, and that too, in their original languages. Hence, in the north-western parts of Europe, in Germany, England, France, where a thousand years ago only the Latin was studied by literary men, there are now found establishments for a critical knowledge both of the Arabic and the Sanskrit literature.

"Hence, too, has been founded recently the *Oriental Translation Committee*, composed of the most eminent Orientalists of Europe, from whose labours so much has already been done, and so much more is expected. The students of Tibetan have naturally been the most rare, if they have existed at all, in this learned association. Insulated among inaccessible mountains, the convents of Tibet have remained unregarded and almost unvisited by the scholar and the traveller:—nor was it until within these few years conjectured, that in the undisturbed shelter of this region, in a climate proof against the decay and the destructive influences of tropical plains, were to be found, in complete preservation, the volumes of the Buddhist faith, in their original Sanskrit, as well as in faithful translations, which might be sought in vain on the continent of India. I hope that my sojourn in this inhospitable country, for the express purpose of mastering its language, and

examining its literary stores, will not have been time unprofitably spent, and that this Grammar and Dictionary may attest the sincerity of my endeavours to attain the object I had determined to prosecute.

"Having in the Preface to my Dictionary expressed my respectful thanks to the British Government of India, for its patronage during my Tibetan studies; and having there gratefully enumerated the kindnesses and good services which I have received from several Gentlemen, it would be superfluous here to repeat my acknowledgments. My selection of the English language, as the medium of introduction of my labours, will sufficiently evince to the learned of Europe at large, the obligations I consider myself under to that nation."

Among the selections from the moral maxims of the Tibetan works, in page 165, the reader will be struck with the close, even verbal, agreement of one of them with the Latin version of the great Christian maxim, "quod tu tibi non vis, alteri non feceris." There is in the next page (art. 9) also a sentence against idolatry which M. Csoma finds to breathe the very sentiments of the great Canute, as reported in Brucker's *Historia Critica Philosophia*, vol. i. p. 330, and quoted there from Jo. Georgius Keyslerus, Antiq. Sept. et Celtic, p. 18, thus:——— "ex legibus Canuti regis Daniæ et Angliæ potentissimi. Ita enim inter alia: *Adorationem barbaram plenissimè vetamus. Barbara est autem adoratio, sive quis idola (puto gentium divos) solem, lunam, ignem, profluentem, fontes, saxa, cujusque generis arbores liynaque coluerit.*"

M. Csoma has modestly declined all the honors which the Societies of Europe and India have sought to confer upon him: he cannot however deny himself the title, his present work has ensured to him, of an indefatigable student, a profound linguist, and of a man who has devoted his life to the cause of learning, regardless of any of its popular and attractive rewards, and anxious only for the approbation of posterity.

3.—*Reply to D. S. in the July No. of the* Journal, *page* 367.

A correspondent in your July No. (who I regret has not given us his name, has made a statement of interest respecting the temperature of wells at Náhun, and the locality of the hyæna. As the temperature of all the wells I have hitherto tried in this country (and they are not a few) is considerably above that of the mean temperature of the place, I am inclined to believe this must also be the case at Náhun.

In answer to the query, as to what explanation can be given of the existence of fossil tropical plants in regions where such plants no longer thrive, I beg to refer to Mr. Lyell himself, vol. i. page 3; and his words afford such a good solution of the difficulty, that I cannot forbear quoting them at length. "The great extent of sea gives a particular character to climates south of the Equator, &c. &c. The effect on vegetation is very remarkable:—*tree-ferns*, for instance, which require abundance of moisture, and an equalization of the seasons, are found in Van Dieman's Land, in lat. 42°, and in New Zealand, in lat. 45°." I have endeavoured to infer that the elephant was capable of bearing a climate similar to this, whether successfully or not, must be left to those who reside in the hills to determine; for they alone have the means of making proper observations, which will determine correctly this and other questions of interest, viz., what climate the hyæna, tiger, and rhinoceros are capable of bearing.

R. Everest.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of December, 1834.

Day of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.					Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.		
	At 4½ A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum at 4½ A.M.	At 10 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 5 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.	At 4 P.M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
1	,007	,088	,958	,012	64,2	72,7	93,2	75,8	69,2	4,2	9,8	12,0	6,7	81	77		o.	ne.	n.	clear.	clear.	clear.
2	,983	,040	,944	,022	64,4	72,3	91,7	75,8	69,2	4,1	8,8	10,2	5,9	85	89		n.	ne.	n.	do	do	do
3	,991	,076	,970	,033	64,7	71,9	92,5	75,1	68,4	4,3	6,9	12,5	7,4	90	75		n.	ne.	n.	do	do	do
4	,010	,066	,964	009	67,2	72,2	96,6	75,4	67,0	5,9	7,4	8,6	3,0	89	84		n.	n.	n.	do	do	do
5	,009	,092	,980	,046	68,0	73,2	96,5	75,6	74,2	0,0	6,4	7,1	5,8	91	90		n.	ne.	n.	do	do	cum. cir.
6	,998	,080	,968	,016	69,5	72,9	90,0	76,6	72,5	5,0	6,4	7,7	7,3	93	89		nw.	n.	s,	cloudy.	hazy.	cloudy.
7	,987	,034	,931	,962	68,2	71,8	75,0	74,0	71,0	5,2	6,8	6,0	4,5	89	91		ne.	n.	n.	hazy.	overcast.	do
8	,965	,996	,896	,960	70,0	72,9	80,0	75,2	71,0	3,9	5,3	7,5	2,8	94	90	,02	o.	ne.	n.	cloudy.	shower.	do
9	,877	,970	,889	,954	68,2	72,9	78,2	73,9	67,2	2,0	5,3	5,7	1,3	95	95		e.	ne.	ne.	clear.	overcast.	clear.
10	,930	,020	,936	,999	67,0	71,9	88,0	75,3	65,0	1,5	4,1	6,6	1,6	99	91		n.	n.	n.	clouds.	cloudy.	do
11	,998	,006	,920	,015	64,4	68,9	88,7	73,6	68,6	1,4	4,1	7,4	2,5	97	89		n.	ne,	nw.	stratus.	do	hazy.
12	,973	,044	,929	,014	64,4	71,2	90,8	74,0	69,0	1,4	4,8	8,3	3,3	95	86		o.	nw.	o.	clear.	clear.	fog.
13	,989	,078	,979	,043	64,0	70,5	92,8	75,7	70,5	1,9	5,8	8,8	2,5	93	84		n.	nw.	n.	do	do	do
14	,028	,071	,968	,020	66,8	72,0	97,7	74,5	69,7	2,1	7,4	9,8	6,2	87	80		o.	n.	o.	do	do	do
15	,990	,050	,944	,018	65,4	71,9	93,6	76,4	67,7	2,2	6,7	9,6	4,3	90	82		ne.	n.	o.	fog.	do	clear.
16	,986	,030	,928	,997	65,4	71,2	94,1	75,5	70,0	3,0	7,4	11,1	5,0	83	79		o.	ne.	n.	clear.	do	fog.
17	,980	,044	,926	,004	69,4	70,6	90,3	76,3	69,1	8,4	7,9	11,2	3,7	86	80		o.	nw.	o.	dense fog.	do	do
18	,970	,042	,880	,943	64,4	70,9	95,4	76,2	69,3	2,9	4,5	11,4	3,7	94	78		o.	nw.	o.	clear.	do	do
19	,916	,956	,848	,917	63,2	70,4	87,8	76,0	67,4	3,0	5,7	12,2	5,4	92	78		o.	nw.	o.	do	do	clear.
20	,913	,994	,912	,993	63,7	72,1	94,6	77,4	68,2	2,0	6,3	10,9	5,5	92	81		o.	nw.	n.	fog.	do	do
21	,979	,068	,976	,046	66,5	72,9	96,1	76,9	72,0	2,0	6,4	8,8	5,8	93	87		o.	n.	o.	do	do	fog.
22	,011	,072	,969	,006	67,2	72,7	93,8	79,5	71,0	0,0	4,3	9,8	4,6	97	85		w.	W,	sw.	do	do	clear,
23	,000	,061	,998	,005	67,2	74,3	98,1	73,0	72,1	0,0	5,9	5,2	4,3	93	87		o.	n.	o.	dense do.	do	fog.
24	,000	,070	,980	,033	68,5	74,8	94,1	78,0	73,3	1,2	6,1	7,7	5,8	90	89		o.	nw.	o.	fog.	do	clear.
25	,986	,082	,970	,012	68,1	74,5	98,0	78,0	70,4	1,3	6,6	8,5	3,6	99	87		o.	nw.	n.	do	do	do
26	,994	,096	,960	,052	68,2	73,4	95,1	77,6	72,0	2,3	7,0	8,9	6,3	89	86		o.	nw.	N.	clear.	do	do
27	,994	,080	,950	,007	67,1	73,4	94,5	76,6	69,8	1,9	7,1	9,1	6,4	91	85		n.	nw.	N,	do	do	do
28	,974	,050	,915	,004	65,4	72,4	94,3	75,9	70,2	1,7	6,6	8,7	3,2	90	84		n.	nw.	N,	do	do	do
29	,974	,048	,932	,013	66,4	72,9	90,8	76,2	67,9	2,1	5,2	8,8	4,7	93	87		n.	nw.	n.	do	do dull.	do
30	,983	,050	,930	,008	63,2	70,8	90,0	74,3	64,0	1,2	4,5	8,4	4,8	94	86		nw.	nw.	ne.	do	do mis.	do
31	,980	,072	,922	,965	60,4	69,0	89,5	73,5	62,1	1,2	7,3	10,1	2,9	90	82		nw.	nw.	nw.	do	do	do
Mean,	,978	,047	,941	,003	66,1	72,4	92,2	75,7	69,4	2,5	6,1	9,0	4,7	91,3	84,9	,02	light northerly.			warmer than usual.		

The instruments placed as usual. Having now completed two years of daily observations at the very inconvenient hours of 10½ P. M. and 4½ A. M. to furnish data for the nocturnal tide, these hours will henceforth be omitted, and other phenomena substituted.

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DIRECTIONS TO THE BINDER.

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USEFUL TABLES,

FORMING

AN APPENDIX

TO THE

JOURNAL OF THE ASIATIC SOCIETY.

PART THE FIRST.

COINS, WEIGHTS, AND MEASURES

OF

British India.

Design for the British Indian Rupee.

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, CIRCULAR ROAD.

1834.

CONTENTS AND TABLES.

PLATES.

Madras and Bombay Weights.

In the Madras and Bombay Presidencies, the weights of commerce have been long since made to conform with the avoirdupois system by assuming the nearest approximation in pounds to the local maund, and adjusting the latter to it. Thus at Madras the maund is assumed as equal to 25 lbs. av.: and at Bombay the more convenient equivalent of 28 lbs., or one quarter cwt. has been adopted for the standard maund. As these weights (especially the latter) are convenient by their direct relation to the commercial unit of England, it is neither to be expected nor to be wished, that they should be exchanged for the weights of Bengal. Indeed it should be remembered, that the use of purely English weights even in Calcutta counting-houses can lead to no confusion:—it is the introduction of a fictitious native weight, like the factory maund, that is objectionable as being neither Indian nor English.

The seer at Madras contains 8 pollams of 10 pagodas each, so that like that of Bengal it has the sub-division into 80 parts. In the Malabar system, also used at Madras, $2\frac{1}{2}$ pollam (fanams) make a seer, and the tolam occupies the place of the maund; it is equal to 23.192 lb.

The seer at Bombay is divided into 30 pice, or 72 tanks, of 72 troy grains each.

The conversion of the Madras and Bombay maunds into the bazar mun of Bengal requires another table. A practical estimate of their relative values may, however, be held in the memory by means of the following simple ratios:

Ten Madras maunds = 3 muns, $1\frac{1}{2}$ seers, Bengal, nearly.
Three Bombay ditto = 1 mun, 1 seer, nearly.

The exact ratios between the cwt. and the mun given in page 66, are of course applicable to the derivatives of the avoirdupois pound in the other presidencies*.

* The readiest practical method of reducing the Indian into the English system, where the utmost accuracy is not required, is derived from the equation, 300 muns = 11 tons. Hence we have the following rules in addition to those given in page 66:—

III. Add a tenth to a sum of *muns*, and divide by 30: results, the weight in *tons*.

IV. Multiply a sum in *tons* by 30, and deduct an eleventh from the product: results, its value in *muns*.

V. Deduct one-third from a weight in *muns*, and increase the remainder by one-tenth: results, the weight in cwts. nearly.

VI. Add one-half to a given weight in cwts., and diminish the sum by one eleventh: results, the equivalent in muns, nearly.

For the more exact conversion of one denomination into the other, the following table may be consulted:

TABLE XXIII.—*For the mutual conversion of Bengal, Madras, and Bombay maunds.*

Bengal Muns.	Madras maunds.	Bombay maunds.	Madras maunds.	Bengal muns.	Bombay maunds.	Bengal muns.
1000	3291.428	2938.775	1000	303.820	1000	340.278
100	329.143	293.877	100	30.382	100	34.028
90	296.229	264.492	90	27.344	90	30.625
80	263.315	235.104	80	24.306	80	27.222
70	230.401	205.716	70	21.268	70	23.819
60	197.487	176.328	60	18.230	60	20.416
50	164.571	146.938	50	15.191	50	17.014
40	131.656	117.552	40	12.152	40	13.612
30	98.742	88.164	30	9.114	30	10.209
20	65.828	58.775	20	6.076	20	6.806
10	32.914	29.388	10	3.038	10	3.403
1	3.291	2.939	1	0.304	1	0.340
seers, 30	2.469	2.203	seers, 30	0.228	seers, 30	0.255
20	1.646	1.469	20	0.152	20	0.170
10	0.823	0.734	10	0.076	10	0.085
5	0.411	0.367	5	0.038	5	0.042
4	0.329	0.294	4	0.030	4	0.034
3	0.246	0.220	3	0.022	3	0.025
2	0.164	0.147	2	0.015	2	0.017
1	0.082	0.073	1	0.008	1	0.008

The next table will be found very convenient for reducing the decimals of maunds in the foregoing, and upon all other occasions, into the ordinary divisions of the native weights, viz. seers and chitaks.

TABLE XXIV.—*For converting* SEERS *and* CHITAKS *into* DECIMALS *of a* MUN *and vice versâ.*

Chtk.	Decimals for				Seers.	Decimals.
	0 seer.	1 seer.	2 seers.	3 seers.		
0	.0000	.0250	.0500	.0750	4	.1000
1	.0016	.0266	.0516	.0766	8	.2000
2	.0031	.0281	.0531	.0781	12	.3000
3	.0047	.0297	.0547	.0797	16	.4000
4	.0062	.0312	.0562	.0812	20	.5000
5	.0078	.0328	.0578	.0828	24	.6000
6	.0094	.0344	.0594	.0844	28	.7000
7	.0109	.0359	.0607	.0829	32	.8000
8	.0125	.0375	.0625	.0875	36	.9000
9	.0141	.0391	.0641	.0891	40	1.0000
10	.0156	.0406	.0656	.0906		
11	.0172	.0422	.0672	.0922	The three last figures of decimals recurring in the same order, after every four seers, it is unnecessary to insert them at length.	
12	.0187	.0437	.0687	.0937		
13	.0203	.0453	.0703	.0953		
14	.0219	.0469	.0719	.0969		
15	.0234	.0484	.0734	.0984		

General Table of Indian Weights.

However desirable it may be in theory to reduce the system of weights throughout the vast continent of India into order and uniformity, in practice it is well known that inseparable difficulties oppose the execution of such a project: if ever effected, it can only be done in the gradual progress of time, by the spread of knowledge, and by the growing inter-communion of the multitudes engaged in the internal traffic of the country, who would by degrees feel the advantage of uniformity in their dealings.

It is a comparatively easy thing for a government, having the sole issue of coin within its own territories, to fix upon a convenient unit of value, and establish it to the supercession of former currencies; but the weights of a country do not so immediately come in contact with the ruling power (even though it have a commercial chararcter itself): not at least as regards the domestic or market weights, which are localized in a thousand distinct foci under as many modifications of prices, customs, and modes of calculation and subdivision.

It is but lately that the legislature has attempted to equalize the weights of England, and then only by the retention of a double system. India does however in some respects offer a better chance of success than the countries of Europe, where each locality has by municipal laws rendered permanent and cognate its own system, however differing from that of its neighbour. Here, all is vague—the standards of reference being in most cases the local rupee or copper coin, themselves subject to variation; or of modern introduction, and capable of equalization.

Thus, throughout the Marhatta states, the seer is referred to the Poona or Ankoosy rupee: in Guzerat, to the Barooch rupee: in Ajmeer, to the Salimsahy; in Bengal, to the old Moorshedabad rupee; all comparatively modern. In Madras, the coin of that presidency, or of Mysore, or Pondicherry, are appealed to; but more generally the English avoirdupois unit has become familiarized, as has been already stated, by the adoption of 25 lb., to represent the commercial maund.

By perseverance, therefore, in upholding one common system for the whole of British India, or at least for the Bengal Presidency,—a system founded on the previous habits and institutions of the country; by connecting it (as has been done) with a rupee of general, and to be hereafter exclusive, circulation; by restricting Government transactions to this system, and affording facilities of adjustment by depositing standard weights in public offices all over the country;—there is some reason to hope that eventually, the incongruous mass now prevalent will gradually give place to the convenience of an universal and single species of weight.

There is another argument in favor of its feasibility, namely, that India does not, properly speaking, possess dry or liquid measures.

Where these are employed, they depend upon, and in fact represent, the seer or the maund weight; the mention of *measures* has been accordingly omitted in the foregoing scheme for Bengal, leaving the value of any vessel of capacity to rest solely on the weight contained in it.

The mode in which this is effected for the "dry measures" of South and West India is, by taking an equal mixture of the principal grains, and forming a vessel to hold a given weight thereof, so as to obtain an average measure. Sometimes salt is included among the ingredients*. Trichinopoly is the only place where grain is said never to be sold by weight. The *mercal* and *parah* are the commonest measures; the latter is known throughout India; in Calcutta it is called *ferrah*, and is used in measuring lime, &c. which is still recorded however in mds. wt.

Of the origin or antiquity of the Indian weights it would be out of place here to institute an inquiry; the ancient metrology of the Hindus has been fully described by Mr. Colebrooke, in the Asiatic Researches, vol. v.† As with the coins, so with the weights, Southern India retained most of the names and terms properly Hindu, *pala*, *túla*, *vís*, *bhára*, *khari* (candy ?) *báha*. Throughout the Moghul empire, on the contrary, the *seer* and *mun* were predominant. The word *mun*, of Arabic or Hebrew origin‡, is used throughout Persia and Northern India; but, as might be expected, it represents very different values in different places: thus the *mun* of Tabríz is only $6\frac{1}{3}$ lb. avoir. while that of Palloda in Ahmednugur, is $163\frac{1}{4}$ lbs.

It is probable that the seer or *sér*, a Hindu weight (*sétak*) was more uniform than the maund, since it was founded upon the tola (*tolaka*), which, with its subdivision, the *massa*, must in very ancient times have been extensively known throughout commercial Asia: there can be little doubt that the *tale* and *mace* of the Chinese are identical in origin. The variations of these weights may have been smaller, because their use was nearly confined to the precious metals and other articles of value; the seer is quoted as the highest denomination of this class of weights in one Sanscrit work. For gross produce a greater latitude was required, and larger seers were introduced to suit the value of each article; the weight apparently, rather than the price, being made variable: while to prevent the ambiguity which might follow, it became necessary to define the seer employed as of 30, 40, 60, 72, 80, 90, or even as far as 120 tolas; and

* In Belary this is called the *nou-danium* measurement; from the nine sorts of grain used: rice, wheat, coolty, pasaloo, mernoomooloo, oil seeds, Bengal grain, aunoomooloo, and nooloo. In Darwar, they take: wheat, toor, hurburr, roolthee, moony, oored, juwaree, paddy, and mudkee.—*Kelly's Metrology.*

† Capt. Jervis of the Bombay Engineers, is engaged in publishing a work on the weights and measures of India.

‡ The Hebrew *maneh* was equal to 13110 grs. tr. or 72.83 tolas. The Greek *mina* to 6244 grs. or 34.57 tolas.

probably when the current coin began to vary from the original tola, the mention of this weight became obsolete, and reference was made direct to the rupees of the local currency. It is to meet this mode of expression that in the following table, the value of every seer has been given in the standard *tola* of 180 grains.

The maund of India may as a *genus* be divided into four different *species*: 1. That of Bengal, containing 40 seers, and averaging about 80 lbs. avoir. 2. That of Central India (Malwa, Ajmeer, &c.) generally equal to 40 lbs. avoir. and containing 20 seers, (so that the seer of this large portion of the continent assimilates to that of Bengal.) 3. The maund of Guzerat and Bombay, equal to $\frac{1}{4}$ cwt. or 28 lbs. and divided into 40 seers of a smaller grade. 4. The maund of Southern India, fixed by the Madras Government at 25 lbs. avoir. There are however many other varieties of maund, from 15 to 64 seers in weight; which it is unnecessary to particularize.

Abul Fuzl defines the *mun* of Akber's reign to be 40 *seers* of 30 *dams*; each *dam* being five *tanks*. The *tank* is in another place described as 24 *ruttees*: the *masha* of eight *ruttees* has been assumed from the weight of Akber's coins to be 15.5 grs. troy. This would make the emperor's maund = 34. $\frac{3}{4}$ lbs. av., agreeing pretty well with that of Central and Western India. The *tank*, as now existing in Bombay, is 72 grains; in Darwar, it is 50 grains, in Ahmednugur, 268 grains. Its present weight consequently affords no clue for the verification of the above estimate, however desirable it may be to determine the point. In one part of the Ayeen Akbery, the dam is called 20 *mashas*, 7 *ruttees*, which would increase the maund to about 47 lbs. In the absence of better evidence, it may be safe to reckon it in round terms at one-half of our present standard maund.

Origin of present table.

In 1821, the Honorable Court of Directors called upon their commercial agents, collectors of customs, and other public officers of the three presidencies, to procure and forward to England accurate counterparts of the standard weights and measures in use throughout their territories in the East. The order was promptly obeyed, and the required models sent home, with certificates and explanations. The packages as they arrived were placed under charge of Dr. Kelly, who was assisted in his examination and comparison of the weights by R. Bingley, Esq. H. M. Assaymaster, and of the measures by E. Trough-ton, Esq.: both of whom had zealously co-operated in comparing the standards sent to the English Government from other parts of the world.

The despatches accompanying the standards from India contained full information, on the money and trade, as well as on the metrology of most places: this is embodied at length in the supplement to Dr.

Kelly's *Cambist*, whence it was subsequently collected in an octavo volume, entitled "Kelly's Oriental Metrology."

It is from these sources that the accompanying table has been drawn up, exhibiting in an abridged form the principal commercial weights of India and Asia. Most of the subdivisions peculiar to each place have been necessarily omitted for want of space, but where possible, the formation of the seer, &c. from the local unit is mentioned. It may be generally assumed that the maund system follows the common scale, viz.

16 chitaks = 1 seer
40 seers = 1 maund.
20 maunds = 1 candy or maunee.

The use of a five-seer weight also universally prevails under the name of *pussêree* *, *dhuree*†, or *vis*‡. The dhuree from its name however seems to be properly a measure, and accordingly, while in Malwa it is equal to 5 seers, in other places it is found of 4, $4\frac{1}{2}$, $5\frac{3}{4}$, 10, 11, and 12 seers. The terms *adhola*, *adhelee*, (half,) *pao*, *powah*, (quarter,) *adhpao*, (half-quarter,) frequently occur: they explain themselves.

The only novelty in the present table is the insertion of the two last columns, expressing the equivalents of the local weights in the standard *mun* and *tola* of the British Indian system. The column containing their values in avoirdupois pounds, ounces, and drams is according to the London determinations of Dr. Kelly.

Where the seer only of any place is mentioned in the first columns, the value of the maund of the same place expressed in parts of the standard mun is inclosed in brackets to prevent mistakes: it may be remarked that the ratio of the maund will answer equally well for the seer, it being understood that the subdivision into 40 seers holds for the maunds of the two places compared. To reduce any local weight into the standard denomination, or into the Bazar maund of Calcutta, nothing more is necessary than to multiply by the number in the last column, and convert the decimals into seers, if so required, by means of Table xxiv. in page 74.

The column of "tolas per seer" will best express to a native the value of the weights, of any particular locality; being the customary mode of estimation throughout the country.

In expressing the dimensions of the *mercal*, the *parah*, and a few other dry or liquid measures, sometimes gallons and sometimes cubic inches have been introduced by Dr. Kelly. It may be convenient there-

* Written *punchseree*, *punchser*, and *punchaseer* in Kelly.
† Written *dhuree*, *dhurra*, *dhuddee*, *dudda*, *dhadium*, in ditto.
‡ Written *vis*, *viss*, *visay*, *vesey*, *biss*, in ditto.

fore to explain that by the enactment of the 1st January, 1826, one *imperial measure* was established, as a substitute for the variable wine, ale, and corn gallons of England, with their multiples and divisions.

This *imperial gallon* was made to contain 10 lbs. avoirdupois weight of distilled water, weighed in air at the temperature of 62° Farht., the barometer standing at 30 inches. It has a capacity therefore of 277.274 cubic inches. Some of the most useful derivatives of this unit are here subjoined for the sake of reference.

Table XXV.

Imperial dry and liquid measures.	*Cubic contents.*	*Avoirdupois wt.*	*Indian wts.*
1 pint,	34.659 c. i.	1 lb. 4 oz.	48.611 tolas.
2 = 1 quart,	69.318 do.	2 lb. 8 oz.	97.222 do.
8 = 4 = 1 gallon,	277.274 do.	10 lbs.	4.861 seer.
64 = 32 = 8 = 1 = 1 bushel,	1.284 c.f.	80 do.	38.888 do.
512 = 256 = 64 = 8 = 1 quarter,	10.269 do.	640 do.	7.777 mun.
2048 = 1024 = 256 = 32 = 4 = 1 chaldron,	41.075 do.	2560 do.	31.111 do.

The old *wine gallon* contained 231 cub. inches—the *ale gallon* 282 c. i. and the *corn gallon* 268.8 c. i. whence are obtained the following multipliers to convert them into the imperial measures, viz. .833, 1.017, and .969 respectively.

It will be remarked that the gallon nearly corresponds with the *pusséree*, or *dhuree* of the Indian corn measures, while the bushel bears the same proximity to the mun weight. Standards of the bushel, gallon, quart, and pint, are deposited in the assay offices of the three presidencies.

The following is the scale of measures in use at Madras:

			cub. inch.	
		1 olluck,	= 11.719.	
8 ollucks,	=	1 puddy,	= 93.752.	
8 puddies,	=	1 mercal,	= 750	= 27 lb. 2 oz. 2 dr. water.
5 mercals,	=	1 parah,	= 3750	
400 parahs,	=	1 garce,	= 300000.	

The particulars of the dry measure of Ceylon are thus given in the Indian Metrology.

			gallons.	inch.	inch.
4 cutchundoos,	=	1 seer,	= 0.24	= 4.35 diam.	+ 4,35.
4.8 seers,	=	1 coornly,	= 1.15		
2.5 goornies,	=	1 mercal,	= 2.88		
2 mercals,	=	1 parah,	= 5.76	= cube of 11.56 inches.	
8 parahs,	=	1 amonam,	= 46.08	= 5¾ bushels.	
9⅛ amonams,	=	1 last,	= 432,	= 6¾ qarters.	

Thus it will be seen that there is no fixed rule as to the subdivisions and multiples of the parah or mercal.

TABLE XXVI.—*The Commercial weights of India, and of other trading places in Asia, compared with the British Indian Unit of weight, and with the Avoirdupois system of England.*

Place.	Denomination of Weight.	Value in English avoirdupois weight.	No. of standard TOLAS per seer, &c.	Value of mds. &c. in MUNS and decimals.
		lb. oz. dr.	*Tolas.*	*Muns.*
ACHEEN in Sumatra.	*Tale*, of 16 mace or 64 copangs.	grs. 148.2	0.790	..
	Cally=100 tales or 20 buncals.	2 1 14¾	82.370	..
	Bahar, of 200 catties.....	423 8 0	..	5.1466
	Bamboo, liquid measure.	3 10 10	130.890	..
AHMEDABAD in Gujrat.	*Tola*=32 vals, or 96 ruttees. ..	grs. 193.440	1.075	..
	Seer (divided into ½ and ¼ s.) ..	1 0 14½	41.091	..
	Maund, of 40 seers.....	42 4 13	..	0.5140
AHMEDNUGUR, in Arrungabad.	*Tola*=12 massas or 96 gonje. ..	grs. 188.4	1.047	..
	Seer, com. wt. (of 80 Ankosy rs.)	1 15 8	76.562	..
	Maund, of 40 seers.....	78 15 12	..	0.9599
	Seer, of capacity (110 Ankosy rs.)	2 11 6	105.425	..
	Maund, do=12 pylees=48 seers.	130 2 0	..	1.5814
AMBOYNA, in the Moluccas.	*Tale*, of 16 mace.....	grs. 455.35	2.529	..
	Bahar, of cloves.....	596 12 0	..	7.2521
	Coyang, of rice (2,500 catties) ..	3255 8 0	..	39.5632
AHMODE, Gujrat.	*Maund*=40 srs of 40 Baroach rs.	40 8 12	39.424	0.4928
	Do. for grain,=40 srs. of 41 do.	41 9 5	40.416	0.5052
	Do. for cotton,=42 seers do. do.	43 10 10	..	0.5306
ANJAR, Bhooj.	*Maund*, of 40 seers (of 36 dokra).	27 3 8	26.464	0.3308
	Kulsee, measure,=64 maps.	30361.6 c.in.	..	..
ANJENGO, Travancore, M.	*Candy* (=35 telong of 16 lbs.)..	560 0 0	..	6.8056
	Maund, (20 to the candy)..	28 0 0	..	0.3402
ARCOT, Madras.	*Pucka seer*, of 24 pollams.	1 13 0	70.486	(0.8811)
	Puddy, for grain=47 pollams...	3 8 12	137.930	..
AUMODH, Culpee.	*Seer*, for cotton, (see Culpee.) ..	1 8 0	58.336	(0.7292)
	Seer, for grain, &c.	2 0 8	78.993	(0.9872)
AURUNGABUNDER in Sindh.	*Tola*=12 massa, or 72 ruttees...	grs. 187.5	1,041	..
	Seer, of 64 pice.....	1 13 13	72.461	..
	Maund, of 40 seers.....	74 10 10	..	0.9074)
BAGULKOTA, M.	*Kucha seer*, for groceries, oil, &c.	0 8 3½	20.	(0.2488)
	Pucka sr. for grain, (116½ c. i.)	3 6 11½	133.	(1.6616)
BAIRSEAH, Malwa.	*Seer*, of 80 Bhopal rupees.	1 14 13	74.892	(0.9362)
	Maund, of 40 seers.....	77 1 12	..	0.9371
BANDA, Moluccas.	*Cally*, of 5⅝ lbs. Dutch.....	6 1 10	..	0.0740
	Bahar, of 100 catties.	610 0 0	..	7.4132
	Soekal, of nutmegs, 28 catties...	170 12 13	..	2.0757
BANGALORE, in Mysore.	*Kucha seer*, of 24 rupees.	0 10 0	24.304	(0.3038)
	Do. maund, of 40 seers.....	25 0 0	..	0.3038
	Candy, of 20 maunds.....	500 0 0	..	6.0764
	Pucka seer, for grain, 84 rupees.	2 1 10¾	81.640	(1.0230)
	Candy, of 20 colagas, or 160 seers.	336 12 4½	..	4.0926
	Mercal, of 9, 10, 12, &c. to 96 srs.			
BANJAR MASSIN, in Borneo I.	*Tale*, of 16 mace.	grs. 614.4	3.413	..
	Pecul and catty, (see China.) ..		..	..
	Last, grain measure=230 gauton.	3066 10 10	..	37.2685
BANTAM, Java.	*Tale*, for gold, musk, &c.	grs. 1055	5.860	..
	Bahar=3 peculs of 100 catties...	396 0 0	..	4.8124
	Coyang, of rice=200 gantams...	8681 0 0	..	105.4982
BANSWARRA.	See Malwa.			
BARDOLER, Surat.	*Maund*, of 39¾ seers, 2 pice.	37 4 4¾	..	0.4529

Place.	Denomination of Weights.	Value in English avoirdupois weight.	No. of standard Tolas per seer, &c.	Value of mds. &c. in Muns and decimals.
		lb. oz. dr.	*Tolas.*	*Muns.*
Baroda, Barôch.	*Seer* (pergunna), 42 Babasahy rs.	1 0 15.8	41.186	..
	Maund, of 42 seers.	44 9 10	..	0.5420
	Candy, of 20 maunds.	892 1 4	..	10.8411
	The town seer has 41 Babash. rs.	1 0 9.5	40.286	(0.5036)
	The Sesamum maund is of 40 srs.	42 7 10·8	..	0.5162
Batavia, Java.	*Mark*, of 9 reals.....	422 grains.	2.344	..
	Bahar=3 peculs, of 100 catties.	406 14 0	..	4.9146
	Coyang, of rice =3,300 lbs. Dutch.	3581 0 0	..	43.5190
	Timbang, of 5 peculs.	678 2 0	..	61.7133
	Kanne, liquid measure.	91 cub. in.	..	..
Bauleah, Bengal.	*Seer*, of 80 sa. wt. or tolas.....	....	80.	1.0000
	Seer, of 60 sa. wt. for liquids, &c.	....	60.	0.7500
Belgaum, Mahratta country.	*Seer*, of 24 Shapoory rs. (174 grs.)	0 9 8	23.091	..
	Maund, of 44 seers.....	26 3 15	..	0.3189
	Tola, of 30 canteray fanams.....	176.25 grs.	0.979	..
Bellary, Mad. ceded distr.	*Seer*, of 21 Mysore rs. or *tolam*.	0 8 7¾	20.621	(0.2578)
	Maund, of 48 seers.....	25 6 0	..	0.3083
	Maund, for cotton(=1¼ nuggah).	26 5 4	..	0.3199
	Thimapoo, grain measure, 112 rs.	....	112.	..
	Mercal,chunam do.=12 seers. ..	....	1008.	0.3150
Benares.	*Tola*, of 215 grains troy.	....	1.194	..
	Seer, of 105 sa. wt.	2 10 6	105.	1.2125
	Seer, of 103 sa. wt.	2 9 2	103.	1.2375
	Seer, of 96 sa. wt.	2 6 7	96.	1.2000
Bencoolen, Sum.	*Tale*, for gold, &c.=638 grains.	....	3.940	..
	Catty, of 16 tales.	1 7 5	55.666	..
Betelfakee, Arab	*Frazil*, of 10 maunds.	20 6 4	..	0.2477
	Bahar, of 40 frazils.	815 10 0	..	9.9121
Bhopal, Bhilsa.	Same as Malwa.			
Birman Empire.	See Rangoon.			
Bombay, Money weight.	*Tank*, of 24 ruttees, (for pearls.)	72 grains.	0.400	..
	Tola, (formerly 179 grs.) .... :	180 grs.	1.000	..
Commercial weight.	*Seer*, of 30 pice or 72 tanks. ..	0 11 3½	27.222	..
	Maund, of 40 seers.	28 0 0	..	0.3402
	Candy, of 20 maunds.	560 0 0	..	6.8056
Grain measure.	*Seer*, of 2 tipprees.....	0 11 3.2	24.836	(0.3104)
	Parah, of 16 pally or adholy, ..	44 12 12.8	..	0.5444
	Candy, of 8 parahs.	358 6 4	..	4.3553
	Parah, salt measure, 6 gallons.	1607.6 c. i.	..	..
	Seer, for liquids, 60 Bom. rs...	1 8 8¼	60.	(0.7448)
Borneo. See	Banjar massin.			
Baroach, Gujrat.	*Maund*,=40 seers, of 40 rs.	40 8 12	39.408	0.4928
	Maund, for grain, 41 do.	41 9 5	..	0.5052
	Maund, for cotton, 42 srs.	43 9 9½	..	0.5397
Bushire, Persia.	*Man*, Tabrézy,=720 miscals. ..	7 10 15	29.888	0.0934
Bussora, Arab.	*Man*, of 24 vakias Sophi.	116 0 0	..	1.4097
Bagdad, Ditto.	*Man*=6 okas of 400 dirhems...	16 8 0	641.600	0.2005
Cachar, Tonquin.	*Tale*, of 10 mace, or 1000 cash.	590.75 grs.	3.282	..
Calcutta.	(See the foregoing pages.)	82⅔ lbs.	80.	1.0000
	Grain weights or measures are derived from the others, thus :			
	1 koonkee=5 chitaks.	....	25.	..
	1 raik=4 koonkees=1¼ seer.	....	90.	..
	1 pally=4 raiks=5 seers.	....	400.	..
	1 soally=20 pallies=2½ maunds.	205⅝ lbs.	5400	2.500

Place.	Denomination of Weights.	Value in English avoirdupois weight.			No. of standard Tolas per seer, &c.	Value of mds. &c. in Muns and decimals.
		lb.	*oz.*	*dr.*	*Tolas.*	*Muns.*
Calicut, Malabar.	*Seer*, of 20 Surat rs.	0	8	$2\frac{9}{35}$	19.849	(0.2481)
	Maund, of 68 seers.	34	11	11	..	0.4220
Cambay, Malabar.	Same as Surat.					
Canton.	See China.					
Cape Town.	$91\frac{4}{5}$ Dutch=100 English weight.					
Carwar, Canara.	*Maund*, of 42 seers.	26	0	0	..	0.3159
Ceylon.	See Colombo.					
Chanadore, in Ahmednuggur.	*Seer*, of 74 Ankosy rs. 10 mas.	1	13	8	71.702	(0.8963)
	Seer of capacity=72 tanks.	2	5	7	90.995	..
	Maund,=64 seers.	149	12	0	..	1.8200
China.	*Tale* (see page 14=579. 84 grs.)	0	1	$5\frac{1}{2}$	3.221	..
	Catty, of 16 tale.	1	5	$5\frac{1}{3}$	51.586	..
	Pecul, of 100 catties.	133	5	$5\frac{1}{3}$	..	1.4987
Cochin, Malabar.	*Maund*, of 25 lbs. of $42\frac{1}{2}$ seers...	27	2	11	..	0.3301
Coimbatoor, Mysore.	*Maund*, of 40 seers.	24	1	0	..	0.2923
	Pollum, (of 10 pagodas.)	$528\frac{1}{2}$ grains.			2.936	..
	Tola, for cotton.	7	8	0	291.666	..
Colachy, Travancore.	*Maund*=125 pollums, of 105 grs.	18	12	13	..	0.2284
	Candy, of 20 maunds.	376	1	2	..	4.5702
Colombo, Ceylon.	*Candy* or Bahar.	500	0	0	..	6.0764
	Garce, (82 cwt. 2 qrs. $16\frac{1}{2}$ lbs.)..	9256	8	0	..	112.4921
	Mercal, dry meas.=10 seer.	2.88 gallons.			..	..
	Parah, do.	5.76 ditto.			..	..
Comercolly, Bn.	*Seer*, for metals, 58 sa. wt. ..... (other seers of 60 and 78 do.)	1	7	9	58	(0.7160)
Coolpahar, Culp.	*Seer*.	3	1	$6\frac{3}{4}$	120.000	(1.5000)
Cossimbazar, Bn.	*Seers*, of 76, 78, 80, and 82.10 tol.					
Culpee, Agra.	*Seer*, for sugar, metals, grain. ..	2	1	15	82.487	(1.0310)
	Seer, for ghee.	2	6	3	92.816	(1.1602)
	Seer, for cotton.	2	6	12	94.184	(1.1773)
	Seer, for grain, wholesale.....	2	7	5	95.552	(1.1944)
Dharwar, Bom.	*Kucha seer*, of 72 tanks.	0	8	$3\frac{1}{2}$	20.0	(0.2488)
	Pucka seer=116 Mad. rs.	2	15	$11\frac{1}{2}$	116.0	(1.4488)
	Dhurra, liquid measure, 12 seers.					
Dewas, Malwa.	*Seer*, of 80 Oujein rupees.	1	15	10	76.866	..
	Maund, of 64 seers.....	137	8	2	..	1.6712
Dindoor, Ahmed.	*Seer*, of 76 Ankosy rs.	1	13	15	72.765	(0.9096)
	Seer, of capacity, 72 *tanks*.	2	7	$6\frac{1}{2}$	95.778	..
	Maund, of 64 seers.....	157	10	0	..	1.9136
Doongurpoor,	*Seer*, of 52 Salimahy rs.	1	4	$0\frac{3}{4}$	48.725	(0.6090)
	Maund, of 40 seers.	50	1	14	..	0.6090
Dukhun poona.	*Seer*, 72 tanks or tolas(80 Ank.rs.)	1	15	$8\frac{1}{2}$	76.638	..
	Maund, of $12\frac{1}{2}$ seers, for ghee, &c.	24	10	$4\frac{1}{4}$	..	0.2994
	Maund, of 14 do. for metals. ..	27	9	$9\frac{2}{3}$	..	0.3353
	Pullah, of 120 do. for iron, &c. ..	236	9	2	..	2.8749
	Maund, of 48 do. for grain.	94	9	8	..	1.1494
Faifoe, Coc. Chi.	Same as in China.					
Furukhabad, Agra.	*Seer*, wholesale 110 sa. wt.? * ..	....			110	(1.3625)
	" retail, 94 do.?	....			94	(1.1750)
	" for spice, 82.	....			82	(1.0250)
Geroulee, Culpee	*Seer*, for all purposes.....	1	15	$0\frac{3}{4}$	75,460	(0.9431)
Ghouhon, Ditto.	*Seer*, for wholesale.	2	2	0	82.638	(1.0330)
Goa, Malabar.	*Quintal*, of 4 arobas.	129	5	5	..	1.5717
	Candy, of 20 maunds.	495	0	0	..	6.0156

* These are marked in Kelly 11, and 14 Furukhabad sicca weight, which must be a mistake for 110 and probably 94.

Place.	Denomination of Weights.	Value in English avoirdupois weight.			No. of standard Tolas per seer, &c.	Value of mds. &c. in Muns and decimals.
		lb.	*oz.*	*dr.*	*Tolas.*	*Muns.*
Gamron, Persia.	*Mun*, Tabree. (Tabrézy ?)	6	12	0	262.400	0.0820
	Mun, Sháhy (=2 *Tabrézy.*)	13	8	0	524.800	0.1640
	Mun, Copra, for provisions.	7	12	0	301.440	0.0942
Hansoot, Barôch.	*Market seer*, of 38 Baroach rs...	0	15	7	37.521	(0.4690)
	Do. maund, of 40 seers.	38	9	9	..	0.4690
	Oil maund, of 42 secrs.	40	8	6	..	0.4925
	Pergunna seer, of 38½ Baroach rs.	0	15	11	38.129	(0.4766)
	Do. maund, of 40 seers.....	39	3	10	..	(0.4768)
Havery, Mad. Doab.	*Kucha seer*, for groceries, 2¾ rs.	0	9	9	23.242	(0.2905)
	Dhurra, (for selling,)=12 seers.					
	Pucka seer, for grain, (82 cub. in.)	2	6	13	94.336	(1.1792)
Hyderabad, Mad.	*Seer*, of 80 Hyderabad rupees...	1	15	12	77.170	(0.9646)
	Kucha maund, of 12 seers.	23	13	0	..	0.2893
	Pucka do. of 40 do.....	79	6	0	..	0.9646
	Pulla, of 120 seers for selling, ..	238	2	0	..	2.8938
Indore, Malwa.	*Seer*, of 82 Oujein rupees.	2	0	6¾	78.803	(1.9850)
	Maund, of 20 seers, *(for grain.)*	40	8	6	..	0.4925
	Maunee, of 12 maunds.....	486	4	8	..	5.9096
	Maund, of 40 seers, for opium, &c.	81	0	12	..	0.9849
Islampoor, Culp.	*Seer, (see Culpee.)*	2	0	12	79.600	(0.9950)
	Pucka do.	2	0	15	80.056	(1.0007)
Jamkhair, Ahmednugur.	*Seer*, commercial, of 80 Ankosy rs.	1	15	8½	76.638	(0.9580)
	Seer, of capacity=72 tanks.	2	4	14½	89.702	(1.1213)
	Maund, of 64 seers. ?.....	147	10	0	..	1.7941)
Japan.	*Pecul*, (same as China.)	133⅓ lbs.			..	1.6254)
Jaulnah, Hyder.	*Tola*, of 12 mashas.	184.5 grs.			1.025	..
	Pucka seer, of 80 rs. for grain...	2	0	1	77.926	..
	Do. maund, of 40 seers.	80	2	8	..	0.9471
	Kucha maund, of 12 seers, (for ghee, liquids, &c.) measure. ..	24	0	12	..	0.2922
Java.	See Batavia.					
Judda, Arab.	*Maund*, of 30 vakias.	2	3	9⅜	86.400	0.0270
	Bahar=100 maunds, or 10 frazils.	222	8	0	..	2.7039
Jumboosur, Guj.	*Market seer*, of 40 Baroach rs. ..	1	0	2½	39.270	..
	Do. maund, of 40 seers.	40	6	4	..	0.4908
	Cotton do. of 42 seers.	1	0	9	40.256	0.5153
	Pergunna seer, of 40¾ Bar. rs. ..	....			40.000	(0.5000)
Jungypoor, Ben.	*Seer*, of 16 chittacks.	1	8	0½	58.408	(0.7301)
	Seer, liquid measure, ...	50½ c. i.			..	..
Junkceylon, Is.	*Bahar*= 6½ Ben. fac. mds.....	485	5	5⅛	..	5.8981
Katee, Ahmed.	*Seer*, of 80 Ankosee rs.	1	15	8½	76.638	(0.9580)
	Seer of capacity=95 do.....	2	5	8	91.146	(1.1393)
Kootool, ditto.	*Ditto*=100 do.	2	7	6½	95.778	(1.1972)
Kota, Ajmeer.	*Seer*, of 30 Kota rs.	0	12	0	29.166	(0.3646)
	Maund, of 40 seers.	30	0	0	..	0.3646
	Seyn (measure), of 864 Kota pice.	34	2	3	..	0.4148
Kurda, Gujrat.	*Seer*, of 80 Ankosee rs.	1	15	8½	76.638	(0.9580)
	Seer, of capacity, 90 do.	2	3	7½	86.208	(1.0776)
Kumbharia, Sur.	*Maund*, of 40 seers, 8 pice.	37	13	10	..	0.4601
Kurod, Ditto.	*Maund*, of 40 do. 15. do.....	37	15	8½	..	0.4615
Loheia, Arab.	*Quintal*, of 100 rottolos.	62	8	0	..	0.7596
Luckipoor, Ben.	Fact. and Baz. weights of Calcutta					
Lucknow, Oude.	*Seer*, of 100 Lucknow rs.	2	7	6¾	95.817	(1.1977)

Place.	Denomination of Weight.	Value in English avoirdupois weight.	No. of standard Tolas per seer, &c.	Value of mds. &c. in Muns and decimals.
		lb. oz. dr.	*Tolas.*	*Muns.*
Macassar, Celebes Is.	*Tale*, of 16 mace=614 grains. ..	....	34.111	..
	Pecul, of 100 catties.	135 10 0	..	1.6483
Madras.	Pagoda weight=52.56 grs.	....	0.292	..
	Maund, of 40 seers, or 8 vis.....	25 0 0	24.304	0.3038
	Candy, of 20 mds.....	500 0 0	..	6.0764
	Garce, for grain=12.8 mds.....	320 0 0	..	3.8888
	Puddy, oil measure=8 olluks, or	9375 cub. in.		
	Parah, for chunam=5 mercals..	3750 cub. in.		
	Mangelin, for pearls=6 grains..			
	18 Mad. chows=55 Bom. chows.			
Madura, Carn.	*Seer*, of 80 Madura pagodas. ..	0 10 4	24.913	..
	Maund, of 39.244 seers.	25 0 0	..	0.3038
Malabar.	*Polam*, of 9 Pondich. rs. 1 cash.	1624 grains.	9.022	..
	Tolam, of 40 seers.....	23 3 1	..	0.2817
Malacca, Malay.	Catty, of 20 buncals, for gold, ..	2 0 12	79.600	..
	Pecul=100 com.catties of 16*tales*.	135 0 0	..	1.6407
	Bahar, of 3 peculs.....	405 0 0	..	4.9219
	Ganton, measure.....	6 8 0	252.775	..
	Kip, of tin,=30 tampang.	40 11 0	..	0.4945
Malda, Ben.	*Seer*, of 100 sa. wt. (72 c. i.)....	2 9 0	100.	(1.2456)
	Do. 96 (at Mogulbaree).	2 7 5¾	95.665	(1.1958)
	Do. 82.10 (at Jelalpoor).....	2 1 14	82,336	(1.0292)
	Do. 80 (English bazar).	2 0 14¼	79.942	(0.9993)
Malwa, central India.	*Tola*, of 12 massas, ...	190 grains.	1.055	..
	Seer, of 84 Salimsahy rs.	2 0 6	78.689	..
	Maund, of 20 seers.	40 7 8	..	(0.4918)
Mangalore, Mal.	*Seer*, of 24 Bombay rs. (42.79grs.)	0 9 13	23.850	..
	Maund, market, of 46 seers. ..	28 2 4	..	0.3419
	Do, Company's, (16 rs. heavier.)	28 8 13	..	0.3469
	Do, for sugar=40 seers.....	24 7 8	..	0.2973
	Seer, of capacity=84 Bomb. rs.	....	84.000	..
Manilla, Phil. I.	Spanish weights and Chin. pecul.			
Massuah, Red Sea	*Rottolo*, of 12 vakias (4800 grs.)	0 10 15½	26.635	..
Masulipatam, M.	*Tolam*=30 chunams.....	grains 179.04	0.995	..
	Kucha seer and maund, as Madras.	0 11 4	27.342	(0.3418)
	Pucka maund=40 seers of 2 lbs.	80 0 0	..	0.9722
	Seer, of 90 Madras pagodas.	0 9 0	21.875	(0.2734)
	Seer, of 72 do. (for metals.)	0 12 0	29.165	(0.3646)
	Seer, of 96, do. (for cotton.) ..	8 5.6	20.210	..
	Mercal, grain measure, 12 seers.	3⅛ gallon		
	Garce, do. do. 4800 seer.	1250 do.		
Mauritius.	*Ton*, of sugar=2000 French, &c.	2160 lbs.	..	26.2500
	Do. of grain and coffee=1400do.	1512 0 0	..	18.3750
	Do. of cloves=1000 do.	1080 0 0	..	13.1250
	Do. of cotton=750 do.....	810 0 0	..	9.8437
Mocha, Arab.	*Maund*, of 40 vakias.	3 5 0	128.640	0.0402
	Bahar=15 frazils, of 10 mds. ..	450 0 0	..	5.4687
	Teman, measure of rice.	168 0 0	..	2.0417
	Gudda, liquid measure=2 gall...	18 0 0	..	0.2187
Moluccas.	See Amboyna and Banda.			
Mundissor, Mal.	*Seer*, of 92 Salimsahy rs.	2 3 7¾	86.246	(1.0781)
	Maund, of 15 seers. (?)	34 4 4½	..	0.4042
Mysore, Province.	*Seer*=24 Mysore rs. of 179 grs.	0 9 13	23.850	(0.2981)
Nassuk, Ahmed.	*Seer*, of 79 Ank. rs. 4 massas...	1 15 4¾	37.030	(0.9504)
	Seer, of capacity, 99 Ank. rs. 2m.	2 7 2½	95.018	(1.1877)

Place.	Denomination of Weight.	Value in English avoirdupois weight.	No. of standard Tolas per seer, &c.	Value of mds. &c. in Muns and decimals.
		lb. oz. dr.	*Tolas.*	*Muns.*
Natal, Sumatra.	*Tompong*, (Benj. wt.) 20 catties,	80 0 0	..	0.9722
	Catty ootan (for do. and camphor)	4 0 0	155.555	..
	Tale, for precious metals.	584 grs.	3.244	..
	Sukat, grain measure=12 pakhas	1029 cub.in.	..	..
Negapatam, Car.	*Seer*, of 8 pullams.	0 9 $10\frac{1}{2}$	23.470	..
	Maund, of 41.558 seers.	25 0 0	..	0.3038
New Hoobly, M. Dooab.	*Kucha seer*=$20\frac{3}{8}$ Mad. rs.	0 8 6	20.352	(0.2594)
	Pucka seer=$106\frac{1}{4}$ do.	2 11 13	106.488	(1.3311)
	Dhnrra, contains 13 seers.	1170 cub. in.	..	..
Nolye, Malwa.	*Seer*, of 80 Oujein rs.	1 15 10	76.864	..
	Maund, of 20 seers.	39 8 8	..	0.4805
Nolgoond, Mad. Dooab.	*Kucha seer*=$20\frac{3}{4}$ Mad. rs.	0 8 $8\frac{1}{2}$	20.736	(0.2592)
	Pucka seer=$110\frac{1}{4}$ M. rs. 96.6 c. i.	2 13 $5\frac{1}{2}$	110.210	(1.3776)
Okalesur, in Baroach.	*Seer*, of 38 Baroach rs.....	0 15 $6\frac{3}{4}$	37.483	..
	Maund, of 40 seers.	38 8 13	..	0.4685
	Pergunna seer, $39\frac{3}{4}$ Br. rs.	1 0 $2\frac{3}{4}$	39.306	(0.3913)
	Maund, 40 seers.	40 6 13	..	0.3912
Omutwara, Mal.	*Seer*, of 81 Salimsahy rs.....	1 15 $3\frac{3}{4}$	75.916	(0.9489)
	Maund, of 28 seers.	54 10 8	..	0.6642
Onore, in Canara.	*Maund*, of 40 to 44 seers, ...	25 0 0	..	0.3038
	Hany, grain measure.....	$87\frac{3}{4}$ cub.in.	..	..
Oujein, Malwa.	*Seer*, of 80 Oujein rs.	1 15 10	16.866	(0.9608)
	Maund, of $16\frac{2}{3}$ seers.	33 5 13	..	0.4054
	Maunee, of 12 maunds.	400 5 12	..	4.8655
Paichal, Surat,	*Maund*, of 48 seers, 8 pice, Surat.	45 4 0	..	0.5469
Palamcota, Carnatic.	*Tolam*, of 100 pollams, ($\frac{1}{2}$ a md.)	12 8 0	..	0.1519
	Puddy, for metals.	4 15 0	192.014	0.0600
	Mercal, retail=$1\frac{1}{8}$ gall. revenue=	$2\frac{5}{32}$ gallon.	..	..
Palimbang, Sum.	*Catty*, of 10 tales.	9494 grains.	52.744	..
	Baly, of 10 gantangs.	81 6 0	..	0.9888
Palloda, Ahmed.	*Seer*, of 78 Ank. rs., $10\frac{1}{2}$ massas.	1 15 2	75.651	(0.9456)
	Seer, of capacity, $103\frac{1}{2}$ Ank. rs.	2 8 13	99.195	..
	Maund, do. of 64 seer.	163 4 0	..	1.9839
Pandree, Culpes.	*Seer*.	2 11 12	106.340	(1.3292)
Panwaree, Do.	*Seer*.	2 2 2	82.943	(1.0368)
Parnair, Ahmed.	*Seer*, of $76\frac{1}{2}$ Ankosee rs.	1 14 $2\frac{1}{2}$	73.296	(0.9162)
	Seer, of capacity, 95 rs. 7 m...	2 5 2	90.233	(1.1279)
Patna, Behar.	*Tola*, of 12 massas.	209 grains.	1.161	..
	Seer, from 45 to 81 sa. wt.	..	80	1.000
Pegu, Birma.	*Tical*, 100 to the vis.....	$237\frac{1}{3}$ grains.	1.368	..
	Candy, 150 vis, reckoned at	500 0 0	..	6.0764
	Basket, rice measure, 16 vis.....	53 0 0	..	0.7048
Persia.	*Mun* of Shiraz=600 miscals.....	12 10 14.4	493.172	0.1541
	Mun of Tabréz, 300 do150 dirhems	6 5 7.2	246.530	0.0770
	Artaba, corn measure, 2 bushels.			
Pertabgurh, Ajmeer.	*Seer*, of 80 Salimsahy rs.....	1 14 $13\frac{1}{2}$	74.967	..
	Maund, of 20 seers.	38 8 14	..	0.4686
Pondicherry, Car. C.	*Seer*, of $24\frac{3}{8}$ Pon. rs.=$731\frac{1}{4}$ fan.	0 9 $11\frac{1}{2}$	23.622	..
	Maund, of 8 vis.	25 14 $5\frac{1}{2}$	..	0.3146
	Garce of grain,=100 mercals...	$13\frac{1}{2}$ quarters.		
Penang.	Malay *pecul*, of 100 catties.....	142 10 $10\frac{3}{8}$	..	1.7338
	Bahar, of 3 peculs.	428 0 9	..	5.2013
	Gantang, measure,=4 chupahs..	27165 cub.in.	..	..
Poona.	See Dukhun.			
Quilon, Trav.	*Olunda*, or old Dutch pound. ..	1 1 8	42.535	..

Places.	Denomination of Weight.	Value in English avoirdupois weight.	No. of standard Tolas, per seer, &c.	Value of mds. &c. in Muns and decimals.
		lb. oz. dr.	*Tolas.*	*Muns.*
Quilon.	*Maund*, of 25 old Dutch pound,	27 5 8	..	0.3325
	Toolam, of 100 pol. for cotton.	16 11 5.6	..	0.2029
	Do. do. for spices.	15 9 7.3	..	0.1894
Radnagore, Ben.	*Seers* of 62, 64, and 80 sa. wt...	....	80	1.000
	Bangee, for paddy=5 seers of 62.	....	310	(0.7750)
Rahory, Ahmed.	*Seer*, of weight=77 ank. rs.....	1 14 5$\frac{3}{4}$	73.790	(0.9223)
	Seer, of capacity=115$\frac{1}{2}$ do.	2 13 8$\frac{3}{4}$	110.666	(1.3833)
Rangoon.	*Vis*, of 100 tikals.	3 5 5$\frac{1}{3}$	140	..
	Candy, of 150 vis, reckoned, ..	550 0 0	..	6.0764
	Ten, or basket, of rice=16 vis...	58 4 0	..	0.7078
Roombharee, Ahmednagur.	*Seer*, of 74 Ankosee rs.....	1 13 2$\frac{3}{4}$	70.901	(0.8863)
	Seer, of capacity, 102 do.	2 8 3$\frac{1}{2}$	97.750	..
	Maund, of 64 seers.	160 13 8	..	1.9548
Rungypoor, Ben.	*Seers* of 60, 65, 73, 80, 90, and 160 tolas; the standard seer,..	....	80	1.000
Rutlam, Malwa.	*Seer*, of 84 Salimsahy rs.	2 0 6	78.689	..
	Maund, of 20 seers.	40 7 8	..	0.4918
Salangore, Maly	*Bahar*, of 240 catties.....	324 0 0	..	3.9374
Sankeridroog, Carnatic.	*Seer*, of 8 pollums, for provisions.	0 9 12	23.698	..
	Maund, of 41.256 seers.	25 0 0	..	0.3038
Santipoor, Ben.	*Seers*, of 60, 80, 84, and 96 tolas; also factory weights.	....	80	1.000
Seringapatam.	*Kucha seer*, of 24 Sultany rs...	0 9 11$\frac{1}{3}$	23.596	..
	Do. maund, of 40 secrs.	24 4 8	..	0.2950
	Puc a seer, of grain ; 84 Sul. rs.	2 1 15$\frac{3}{4}$	82.601	..
	Do. colagah=16 seers.	33 15 12	..	0.4130
Siam.	*Pecul*=50 catties of 20 tale... ..	129 0 0	..	1.5677
Singapore, Malay	*Buncal*, for gold.	832 grains.	4.622	..
	Pecul, of 100 catties, (see China.)			
Sinkell, Sumatra	*Tompong*, of 20 cats. for Benzoin	3 8 0	36.110	..
	Pecul, &c. as in China.			
Sooloo, Sunda.	*Pecul*, as in China.			
Soonamooky, Bl.	*Seers*, of 58. 10, 60, 72, 73$\frac{1}{4}$, 75, and 82.10 tolas; stand. seer...	....	80	1.0000
Suez, Red Sea.	*Rottolo*, of 144 drams.	1 4 0	48.610	..
	Quintal varies from 110 to 150 rot.			
Surat, Gujrat.	*Tola*, of 12 massas.	187.2 grs.	1.040	..
	Seer, of 35 tolas.....	0 15 0	36.458	(0.4557)
	Maund, of 40 seers.	37 8 0	..	0.4558
Tellicherry, in Malabar.	*Seer*, of 20 Surat rupees.	0 8 2$\frac{3}{3}$	19.849	(0.2481)
	Maund, of 64 seers.	32 11 0	..	0.3972
Ternate, Molucc.	*Pecul*, of 100 catties.	130 3 8.3	..	1.5826
Tranquebar, Cor	*Maund*=68 lbs. Danish.	74 12 9.6	..	0.9088
Travancore, M.	*Toolam*, of 20 pounds.	19 14 11	..	0.2420
	Candy (30 toolams), for purchase.	597 8 10	..	7.2618
	Do. (20 maunds), for sale.....	500 8 2	..	6.0826
	Parah, grain measure,.....	2 quarts.	..	..
Trichinopoly, Carnatic.	*Pucka seer*,=27 pollams.	1 14 8	74.132	..
	Maund=13.114 seers.	25 0 0	..	0.3038
	Seer, for metals=4167.7 grs.	0 9 8$\frac{1}{2}$	23.167	(0.2896)
	Mercal, grain measure, 1$\frac{1}{8}$ gallon.			
Trincomalee.	See Colombo.			
Vellore.	See Arcot.			
Vizagapatam.	See Masulipatam.			
Wallahjabad.	See Arcot.			

* See page 3.

Linear Measures.

Notwithstanding the boast of Abul Fuzl that among other beneficial effects of Akber's administration, he had fixed one standard of linear measure for the whole of India, we find at the present day as great irregularity in this branch of our subject, as could have prevailed in his day, or rather much greater, an account of the semi-introduction of European measures in the British Indian territories, and in the Dutch and Portuguese settlements before them.

There is this peculiarity in the linear systems, that the basis of all is the same; the cubit or human fore-arm: and this unit is found in Oriental countries, as in those of the west, divided into two spans, and 24 fingers' breadths. Thus under the Hindu princes, the *hat'h* (in Sanscrit *hasta*) was equal to 2 *vitesti* or spans, and to 24 *ungools (angulas)*. The *ungool* (finger) is divided into 8 *jo* (S. *yava*) or barley corns.

The subdivisions of the *yava* proceeding downwards to the *paramánus*, or most minute atom, according to the arithmetical works of the Hindus, are of course theoretical refinements, which it is unnecessary to notice: a full account will be found in Mr. H. Colebrooke's treatise in the 5th volume of the Asiatic Researches. Proceeding upwards, four *hat'hs* or cubits are equal to a *danda*, or staff: and 2000 *dandas* make a *crosa*, or coss, which should be, by this estimation, 4000 yards English, or nearly $2\frac{1}{4}$ miles. The coss is generally for convenience now called equal to two English miles. Four *crosa* = one *yojana*, nearly ten miles. The Lílávati also states that 10 *hat'hs* make 1 *bans* or bamboo, and 20 *bans* in length and breadth = 1 *niranga* of arable land.

That the cubit was of the natural dimensions (of 18 inches, more or less) can hardly be doubted; indeed where the *hat'h* is talked of to this day among the natives, the natural human measure is both understood and practically used, as in taking the draft of water of a boat, &c. In many places also, both in Bengal and in South India, the English cubit has been adopted as of the same value as the native measure.

The *guz*, or yard, now in more general use throughout India, is of Mahomedan introduction: whether this is derived also from the cubit (for the Jewish cubit is of the same length) is doubtful; but, like the *hasta*, it was divided into 24 *tussoos*, or digits, corresponding more properly to inches.

Abul Fuzl, in the Ayeen Akbery, gives a very full description of the various guz in use under the emperors, as compared with the earlier standards of the khalifs. He expresses their correct length in fingers'-breadth, which may be safely taken as three-quarters of an inch each.

For facility of reference, his list is here subjoined, with the equivalents in English measure at this rate.

Ancient Guz measures enumerated in the Ayeen Akbery.

	English
The *Guz-soudah* of Haroon-ur-Reshid = 24⅔ fingers of an Abyssinian slave, the same used in the Nilometer of Egypt*, ...	= 18½ in.
The *Kusbeh guz*, of Ibn Abyliclah = 24 fingers,.....	= 18 do.
The *Yousefy guz*, of Baghdad = 25 ditto, ...	= 18¾ do.
The small *Hashemiah guz*† of Abu Musa Ashari = 28⅓ fingers,..	= 21¼ do.
The long .... *ditto*†.... of Mansur Abás .... = 29⅔ do.	= 22¼ do.
The *Omariah guz* of the Khalif Omar ..... = 31 do.	= 23¼ do.
The *Mamooniah guz* of Maamon Abassy.. .... = 69½ do.	= 52⅛ do.
The *guz Mesahat* ..... = 28 do.	= 21 do.
Sekunder Lodi's *guz* of 41½ silver Sekunderies diameter, modified by Humaioon to 43 ditto,.. = 32 do. .... This was used in land measurements till the 31st year of Akber.	= 26 do.
The *Akbery guj*, for cloth measure,..... = 46 fingers,..	= 34½ do.
The *Ilahy guj*, established by Akber, as the sole standard measure of the empire, ... = 41 do.	= 30¾ do.‡

The *Akbery beega*, of 3600 square guz = 2600 square yards = 0.538, or somewhat more than half an acre on the above estimation.

The *Ilahy guj* of Akber was intended to supersede the multiplicity of measures in use in the 16th century, and in a great degree it still maintains its position as the standard of the Upper Provinces. In general, however, different measures are employed in each trade, and the cloth merchant in particular has a distinct guj of his own. Thus the cloth guj has assimilated in many places to two haths, or one yard; and the frequent employment of English tape-measures, as well as carpenter's two-feet rules, will ere long confirm the adoption of the British standard to the exclusion of the native system, for the linear measure of articles in the bazar.

The true length of the *Ilahy guz* became a subject of zealous investigation by Mr. Newnham, Collector of Furukhabad, and Major Hodgson, Surveyor General, in the year 1824, during the progress of the great revenue survey of the western provinces, when it was found to be the basis of all the records of land measurements and rents of Upper India.—As might have been expected no data could be found for fixing the standard of Akber with perfect accuracy; but every comparison concurred in placing it between the limits of 30 and 35 English inches; and the great majority of actual measures of land in Rohilkhund, Delhi,

* The cubit of the Nilometer is supposed to be the same as that of the Jews, which is exactly two feet English:—if so, the 24 *digits* will be precisely inches. Volney, however, makes it 20½ French, or 22 English inches. Some allowance must probably be made for the broad hand of a negro, but the other measures will not be affected by the same error, as they must be referred to the ordinary delicate hand of a native of Asia.

† These two are also called the Guz Mullik and Guz Zeeadiah, because Zeead, the adopted son of Abu Sofian, made use of them for measuring the Arabian Irak.

‡ Should the length of this guj be taken at 32 or 33 inches, proportionate corrections must be made in the other measures.

Agra, &c. brought it nearly to an average of 33 inches. Mr. Duncan, in the settlement of the Benares province in 1795, had assumed 33.6 inches to the ílâhy guz, on the authority, it may be presumed, of standards in existence in the city, making the beega = 3136 sq. yards.

The results of the different modes of determination resorted to in 1824-5, so characteristic of the rude but ingenious contrivances of the natives, are curious and worthy of being recorded. Major Hodgson made the length of the ílâhy guz

From the average measurement of 76 men's fingers-breadths, ... = 31.55 in.
From the average size of the marble slabs in the pavement of the Taj at Agra, (said to be each a *Shahjehany guz* of 42 fingers?) .. = 33.58 do.
From the side of the reservoir at the same place, called 24 guz, .. = 32.54 do.
From the circuit of the whole terrace, 532 guz ?..... = 35.80 do.
Mr. Newnham, from the average size of 14 char-yaree rupees, supposed to be each one finger's-breadth, makes it,..... = 29.20 do.
From the testimony of inhabitants of Furukhabad,..... = 31.50 do.
From statement in the Ayeen Akbery, of the weight of the cubic guz of 72 kinds of timber, (this would require a knowledge of the weights.).....
Mr. Halhed, from average measurement of 246 barley corns, ... = 31.84 do.
From ½ sum of diameters of 40 Munsooree pice, ... = 32,02 do.
From ½ of 4 humau cubits measured on a string, ... = 33.70 do.
From average of copper wires returned by Tehseeldars of Moradabad as counterparts of the actual measures from which their beegas were formed, ... = 33.50 do.
Mr. Duncan, as above noticed, assumed the ílâhy guz at Benares, = 33.60 do.
In Barelly, Boolunshuhr, Agra, as in the following table, it is .... = 32.5 do.

It is natural to suppose that the guz adopted for measuring the land should vary on the side of excess, and probably all the above, thus derived, are too long. The Western Revenue Board, thinking so many discrepancies irreconcileable, suggested, that the settlements should every where be made in the local beega, the surveyors merely noting the *actual value of the ílâhy guz in each village*, and entering the measurement also in acres; but the Government wisely determined rather to select a general standard, which should meet as far as possible the existing circumstances of the country. Thus the further prosecution of the theoretical question was abandoned, and an arbitrary value of the *ílâhy guz* was assumed at 33 inches, which was in 1825-6 ordered to be introduced in all the revenue-survey records, with a note of the local variation therefrom on the village maps, as well as a memorandum of the measure in English acres. Mr. Sec. Mackenzie thus describes the convenience which the adoption of this standard (sanctioned at first only as an experiment and liable to reconsideration) would afford in comparisons with English measures.

"Taking the *jureeb* (side of the square *beega*) at 60 *guntehs*, or 60 *guz*, the *beega* will be 3600 square guz, or 3025 square yards, or five-eighths of an English acre (3 roods, 5 perches). The *jureeb* will be equal to 5 chains of 11 yards, each chain being 4 *guntehs*. In those places where the *jureeb* is assumed at 54 guz square, it would equal $4\frac{1}{2}$ chains, giving $2450\frac{1}{4}$ square yards (or 2 roods, 10 perches). In either case the conversion from one to another would be simple, and the connection between the operations of the surveyors and the measurements of the revenue officers would be easily perceived."

This convenient beega of 3600 square ilahy guz, or 3025 square yards, or five-eighths of an acre, may be now called the standard of the Upper Provinces. It is established also at Patna, and has been introduced in the settlements of the Ságur and Nerbudda territories.

The notice of land measurement seems altogether to have been overlooked in the returns from the Bengal revenue officers, to the Hon'ble Court's Circular; so that with the exception of the facts gleaned from the official correspondence above alluded to, and other information hastily acquired from private sources, the present table exhibits nearly a blank in regard to the beegas of Bengal proper, Behar, Cuttack, and Central India. Rennel's general estimate of the area of Bengal in beegas of 1600 square yards merely followed the measure in use at Calcutta. The permanent settlement in these provinces left the land unmeasured, and obviated the necessity of an actual survey. In general terms, however, the beega of the Bengal provinces may be assumed at 1600 square yards, or about one-third of the English acre, and a little more than half of the up-country beega.

In Madras, Sir T. Munro established a measure (called *ground* or *mauny*) of 60×40, or 2400 square feet, of which 24 make a *cawney* $=$ 57600 square feet, $=$ 6400 square yards, or exactly four Bengal beegas. The Madras cawney is to the English acre as 1 to 1.3223, or as 121 to 160 nearly. In the jageer, the *ady* or Malabar foot is used, which is 10.46 inches; 24 *adies* $=$ 1 *culy*, and 100 square *culies* $=$ 1 cawney, or nearly an English acre. The common *culy* however is 26 adies, or $22\frac{2}{3}$ feet, which makes the *cawney* $=$ 1 acre $28\frac{3}{4}$ perches.

Of the land measures of the Bombay Presidency Kelly's tables are altogether silent: but as the cubit and guz are stated to correspond with 18 and 27 inches respectively, doubtless the square measure has also been brought to agree with some aliquot or multiple of the English acre.

It is much to be regretted that the information on this most important point should have proved so defective; but in justification of the officers to whom the Court's circular was addressed, it should be stated that the draft of instructions did not specifically allude to square measures, merely directing that 'for measures of length, one that is nearest to the cubit or ell, should be selected as the model to be sent home.'

Table XXVII.—Linear and Square Measures of India.

Place.	Denomination.	Value in Eng. meas.
Agra, Presidency,	Standard Ilahy guz, assumed at,	33 inches.
	Standard Beega of Western Provinces=60×60 guz=3600 *Guz* ..	3025 sq. yds. (⅝ acre.)
	Local *Guz* varies from 32.8 to 33.25, av.	32.625 inches.
Ahmedabad, ..	*Guz*, for cloth, ..	27.75 do.
	for velvet, ..	34.25 do.
	for artificers, ..	23.33 do.
Ahmednugur, ..	*Hath* of 14 *tussaos*, ..	14.00 do.
	Guz, of 1¾ hath, ..	24.50 do.
Alligurh, ..	*Guz*, from 30.5 to 33.4, ..	33.00 do.
Molucca, ..	*Covid*, or cubit, ..	18.13 do.
Ahmod, ..	*Guz*, ..	27.12 do.
Anjar, ..	*Guz*, of 34 tussoos, ..	26.40 do.
Aurungabunder,	*Guz*, of 16 garce, ..	32.00 do.
Bagulkota, ..	*Guz*, of 24 tussoos, ..	32.87 do.
Bangalore, ..	*Hath*, = 19.1 inches: *Guz* = ..	38.90 do.
Bantam, ..	*Hasta*, ..	18.00 do.
Barelly, ..	*Guz*, from 32.0 to 33.4, ..	32.90 do.
Baroda, ..	*Guz*, of 24 tussoos, ..	27.12 do.
Batavia, ..	*Ell*, = 27¾ inches. *Foot*= ..	12.36 do.
Bauleah, ..	*Cubit*, (or hath,) ..	18 do.
Benares, ..	*Guz*, tailor's, ..	33. do.
	weaver's, ..	42.5 do.
	cloth merchant's, ..	37.5 do.
	architect's, (*maimáree*,) ..	25.33 do.
	Beega, by Reg. II. 1795, ..	3136 square yards.
Bencoolen, ..	*Hailoh*, or two cubits, ..	36 inches.
Betelfokee, ..	*Guz*, ..	27 do.
Bombay, ..	*Hath* = 18 inches; the *guz*,= ..	27 do.
Boolundshuhr, ..	*Guz*, (originally, 33,) ..	31.75 do.
Broach, ..	Zillah *guz*, ..	27.25 do.
	Wusa, ..	89.6 sqare inches.
	Beega = 20 wusa, ..	2 roods, 20 perches.
Bushire, ..	*Half guz*, Shâhy, ..	20 inches.
	Bushery, ..	18.4 do.
Bussora, ..	*Aleppo yard*, ..	26.4 do.
	Baghdad, ..	31.6 do.
Calcutta, ..	*Beega* = 20 cottas of 16 chitaks, ..	1600 sq. yards.
	Cottah, ..	720 sq. feet= 80 sq. yds.
	Chittak, ..	45 sq. feet= 5 sq. yds.
Calicut, ..	*Guz*, ..	28.6 inches.
Calpee, ..	*Guz* = 16 girras, ..	40 do.
Cambay, ..	*Guz*, ..	28 do.
	Margen, of 600 square roods, ..	2 English acres.
China, ..	Mathematical foot, ..	13.12 inches.
	Builder's ditto, ..	12.7 do.
	Tailor's ditto, ..	13.33 do.
	200 *lis* = 1 degree, ..	69.166 miles.
Chittagong, ..	*Nul* or bamboo, of 8 haths= ..	12 feet.
(Mug land measures).	*Gundah*, of 4 courees = 2 × 3 nuls= ..	96 sq. yds.
	Kánee = 20 gundahs = 12 × 10 nuls = ..	1920 sq. yds.
	Doon = 16 kanees, ..	30720 sq. yds. or 6.35 acres.
	Shahy measures, 4 times greater, ..	Seldom used now.
Cossimbazar, ..	*Hath*. ..	19.12 inches.
Darwar, ..	*Hath*, for cotton cloths, ..	19.36 do.
	Guz, ..	32.75 do.
Delhi, ..	Average beega, ..	2500 sq. yds.
Etaweh, ..	*Gaz* from 32 to 33, ..	32.50 inches.
Furukhabad, ..	*Cloth guz*=12 *moots* (palms)=48 *ungaal*,	36 do.
	Hath, or cubit=24 ungool or fingers, ..	18 do.
	Land guz= 10½ moots or 42 fingers, = 14 *giras* on cloth g. of 16,	31½ do.
	Beega, of 20 biswas =36.00 ilahy guz,	2756¼ square yards.

Place.	Denomination.	Value in Eng. meas.
Goa, ..	Portuguese *Covado*, ..	26.66 inches.
Gamron, ..	*Guz*, 93 = 100 English yards, ..	38.7 do.
Hansoot, ..	*Gaz*, of 24 tussoos, ..	27.12 do.
Havery, ..	*Gaz*, of ditto, ..	34.75 do.
Hyderabad, ..	Cloth measure, ..	35.33 do.
Japan, ..	*Inc*, ..	75.00 do.
Jaulna, ..	*Guz*, ..	33.6 do.
Jamboosur, ..	*Guz*, ..	27.12 do.
Jungle Mehals, ..	*Beega* 80 × 80 *haths*, ..	1600 sq. yds. nearly.
Bancoora, ..	*Guz*, of two *haths*= ..	36 inches nearly.
Loheia, ..	*Peek*, ..	27.0 inches.
Madras, ..	*Mauney*, 60 × 40 feet, ..	2400 square feet.
	Cawney = 24 mauney, ..	1.3223 acres.
Malabar, ..	*Foot*, ..	10.46 inches.
Malacca, ..	*Covid*, ..	18.12 do.
Malwa, ..	*Guz*, (from 28 to 32,) ..	30.00 do.
	Beega, of 20 wusas, ..	2 roods nearly.
Massuah, ..	*Peek*, ..	27.0 inches.
Masulipatam, ..	*Yard*, ..	38.25 do.
Meerut, ..	*Land*, guz, ..	33.00 do.
Mocha, ..	*Cobid* = 19 inches. Guz, ..	25. do.
Moradabad, ..	*Guz*, from 31.6 to 35.8, ..	33.50 do.
	Jureeb =20 guttas of 3 guz, ..	167.5 feet.
	Beega =18×18=324 sq. guttas, ..	2304 sq. yds.
New Hoobly, ..	*Guz*, ..	31.75 inches.
Noulgoond, ..	*Guz*, ..	33 do.
Palamkota, ..	*Gajum*, for cloth, ..	36.45 do.
Pandree, ..	*Guz*, ..	40.75 do.
Panwaree, ..	*Guz*, ..	36.37 do.
Patna, ..	*Guz*, for carpets, &c. (ilahee,) of 44 fingers,	33 do.
	for broad cloth, ..	42.5 do.
	Jureeb, 20 bamboos of 3 guz= ..	55 yards.
	Beega, 20 × 20 cuttahs or bamboos= ..	3025 square yards.
Persia, ..	*Guerze*, royal, ..	37.5 inches.
	Common measure, ..	25.0 do.
	Parasang, twentieth of a degree at the equa	tor.
Rangoon, ..	*Taong*, or cubit, ..	19.1 inches.
	Taing, of 1000 dhas, ..	2 miles, 293⅜ yards.
Rungypoor, ..	*Guj*, for bafta cloths, ..	63 inches.
Seringapatam, ..	*Gujah*, ..	38.5 do.
Siam, ..	*Vouah*, (2000 = 1 league,) ..	75.75 do.
Soonamooky, ..	*Corah*, used at the factory, ..	52.4 do.
Surat, ..	*Guz*, builder's, ..	27.6 do.
Sydabad, ..	*Guz*, land, 31.3 to 32.7, ..	32.0 do.
Tellicherry, ..	*Guj*, ..	28.4 do.
Tirhoot, ..	Revenue *luggee*, of 6½ haths= ..	9 feet 9 inches.
	Beega, 20 × 20 luggees= ..	4900 sq. yds.
	Small luggee, or rod, 6¾ haths= ..	9 feet 4½ inches.
	Beega, 20 × 20 ditto= ..	3906¼ sq. yds.
	(In Champaran and Chupra the luggee or rod is of 7 haths).	
Travancore, ..	*Tooda*, for timber, ..	20.46 cub. inches.
	Moora, of stone-cutters, ..	33.02 inches.
	Coloo, in agriculture, ..	21.16 feet.
Sagur, ..	Standard beega introduced, ..	(See Agra).

At most of the places omitted in the above table, such as, Acheen, Arcot, Belary, Calcutta, Carwar, Ceylon, Cochin, Comercolly, Jungypoor, Bengal generally, Madras, Penang, Radnagore, Santipoor, Seringapatam, Tellicherry, &c. English measures alone are used, or at least a cubit founded on the English measure of 18 inches.